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Gossen

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(54) SCROLL COMPRESSOR ORBITAL PATH BALANCING MASS

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F04C 2/02 (2006.01)
F04C 29/00 (2006.01)
F04C 18/02 (2006.01)

(52) **U.S. Cl.**

CPC ***F04C 2/025*** (2013.01); ***F04C 18/0215*** (2013.01); ***F04C 29/0057*** (2013.01); *F04C 2240/807* (2013.01)

(58) **Field of Classification Search**

CPC F04C 18/0215; F04C 2240/807; F04C 29/0057; F04C 2/025

See application file for complete search history.

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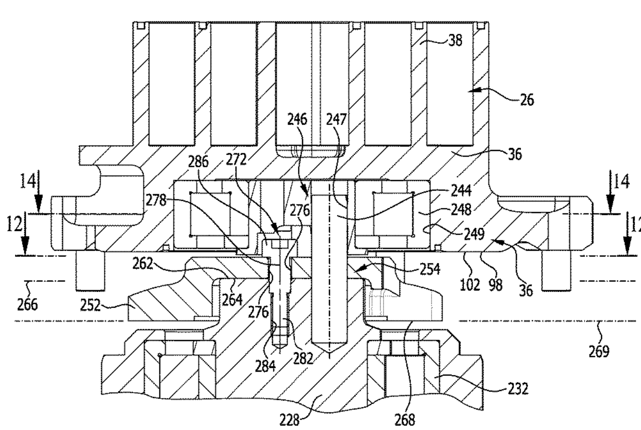
Primary Examiner — Mary Davis

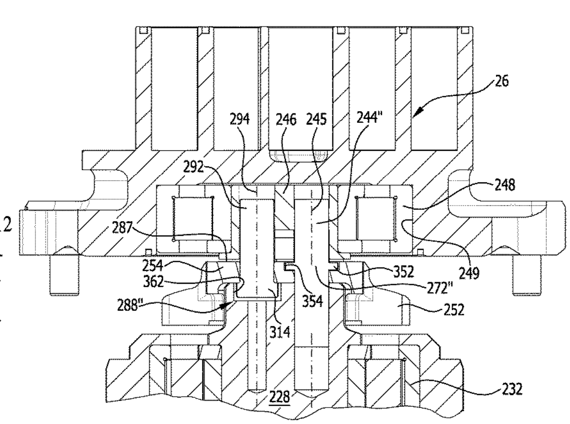
(74) *Attorney, Agent, or Firm* — Reinhart Boerner Van Deuren P.C.

(57) **ABSTRACT**

In order to improve a compressor comprising a compressor housing, a scroll compressor unit which is arranged in the compressor housing and comprises a first stationary compressor body and a second compressor body that can be moved relative to the stationary compressor body, an eccentric drive for the scroll compressor unit, said drive having a drive member which is driven by a drive motor and which revolves about the central axis of a driveshaft on an orbital path, and an orbital path balancing mass which counteracts an unbalance due to the compressor body moving on the orbital path, so that even at high rotational speeds the long-term stability of the drive member guidance in the drive member receptacle can be ensured, it is proposed that the orbital path balancing mass is coupled to the eccentric drive such that the mass moves on the orbital path in a manner corresponding to the movement of the drive member but is uncoupled with respect to the transmission of tilting moments to the drive member.

38 Claims, 18 Drawing Sheets





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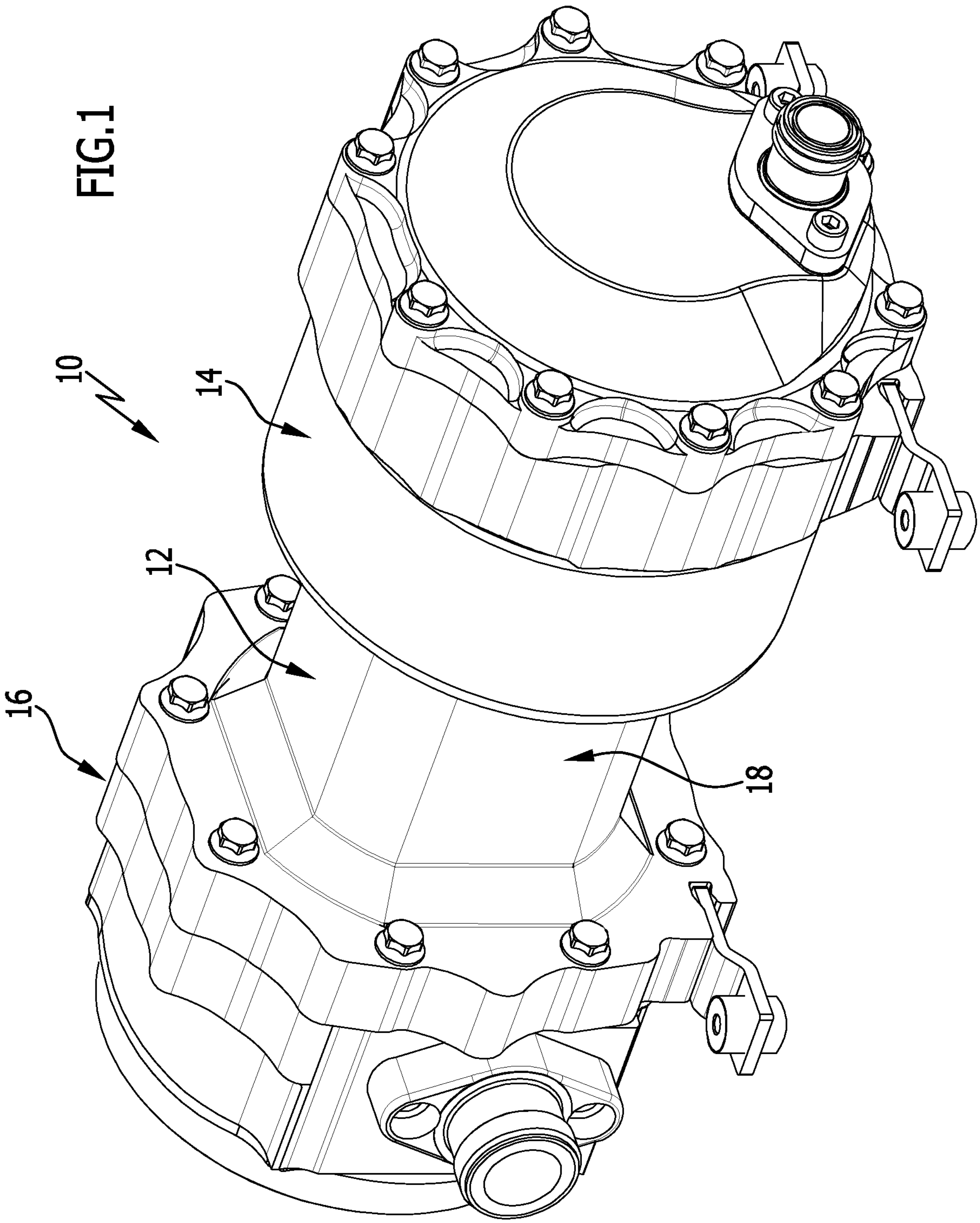

FIG.1

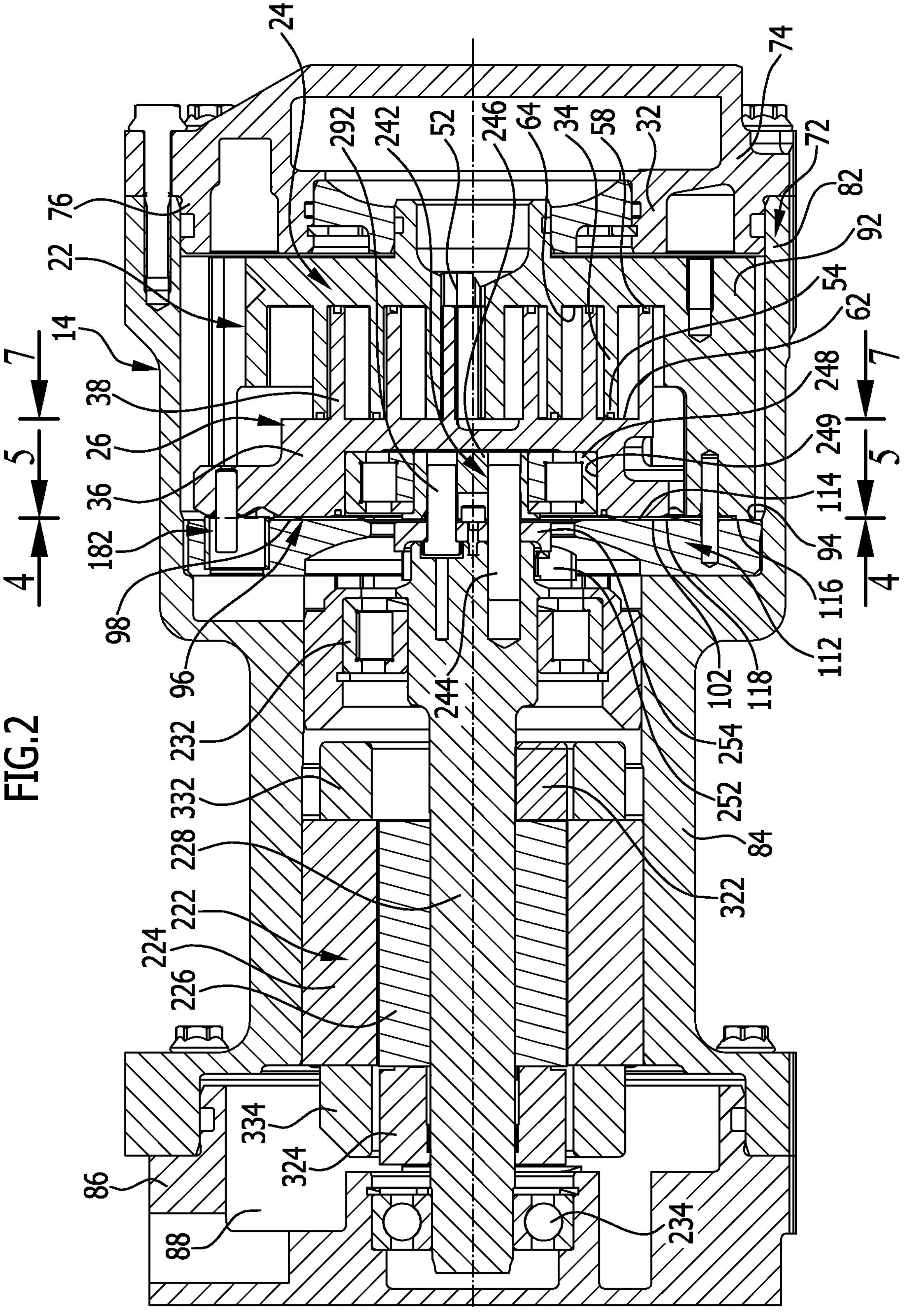
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FIG.2

FIG.3

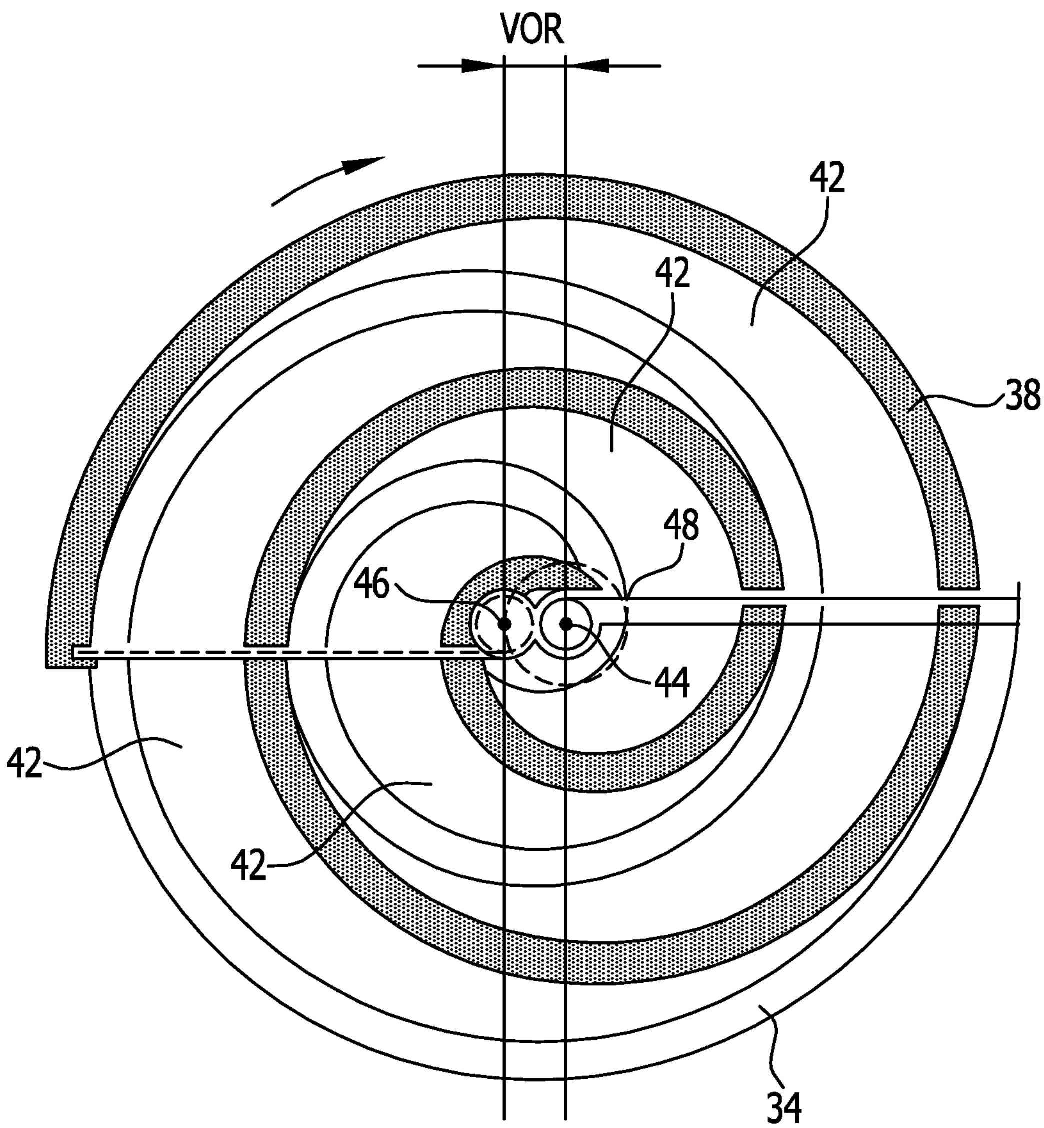

FIG.4

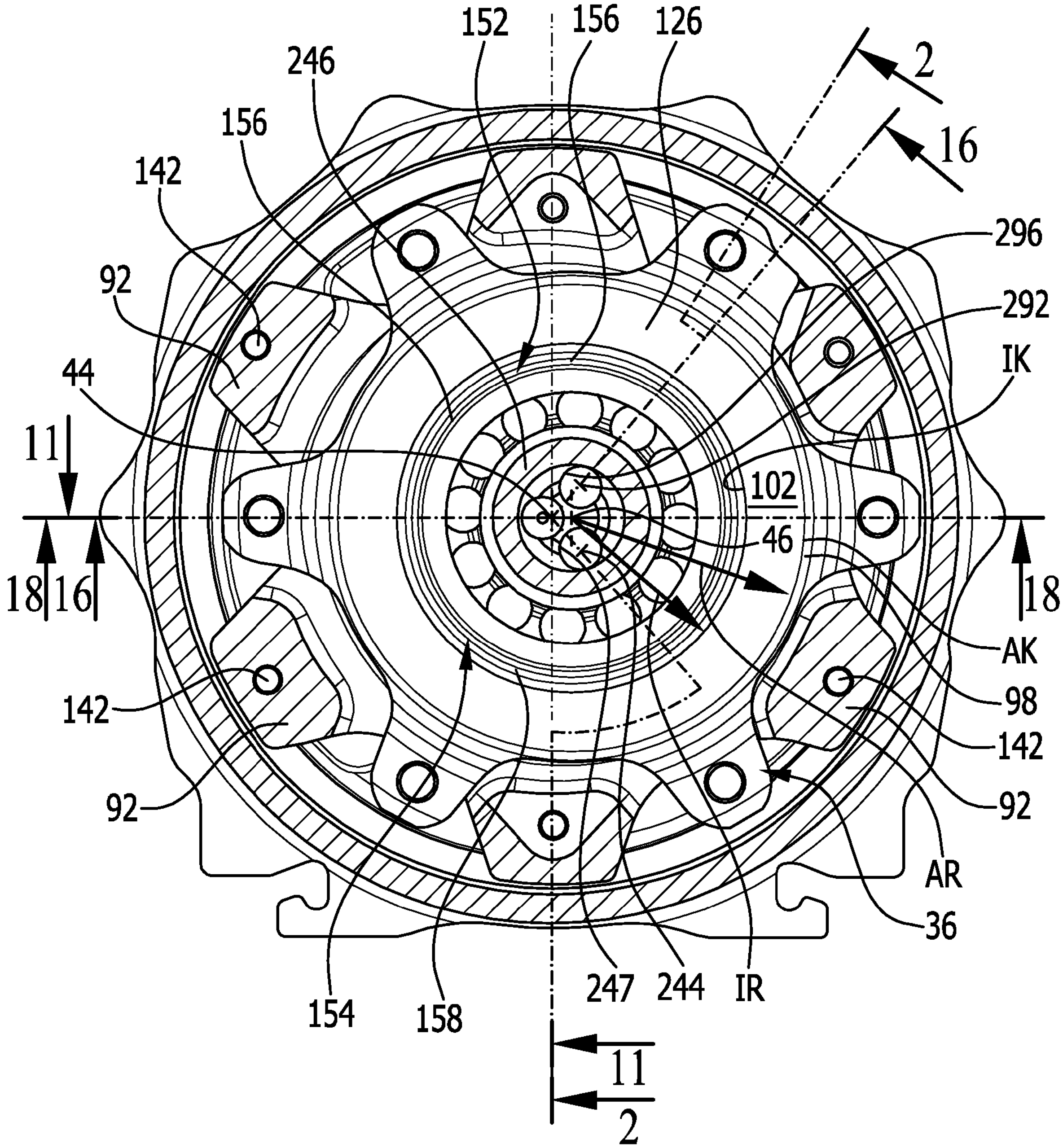
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FIG.5

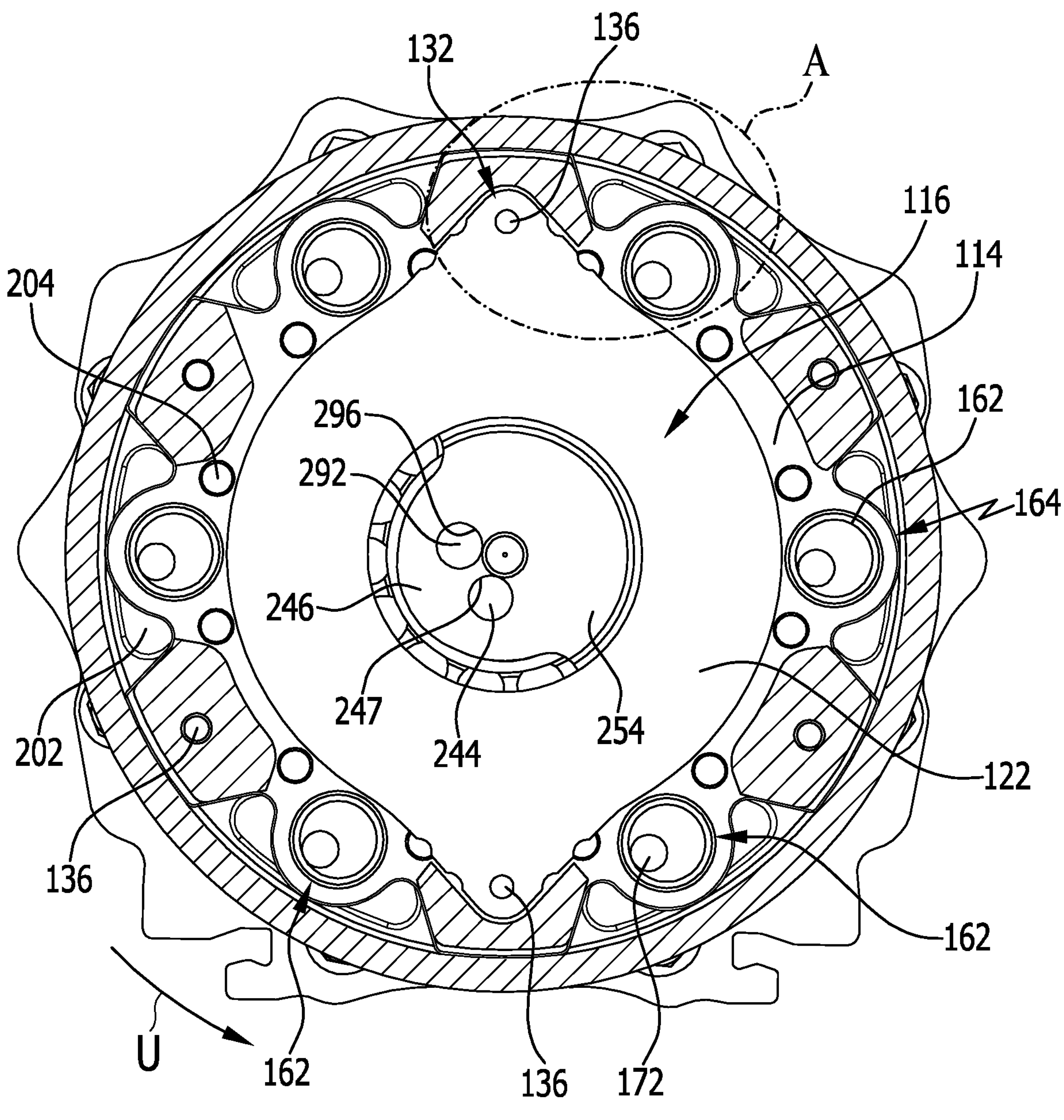
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FIG.6

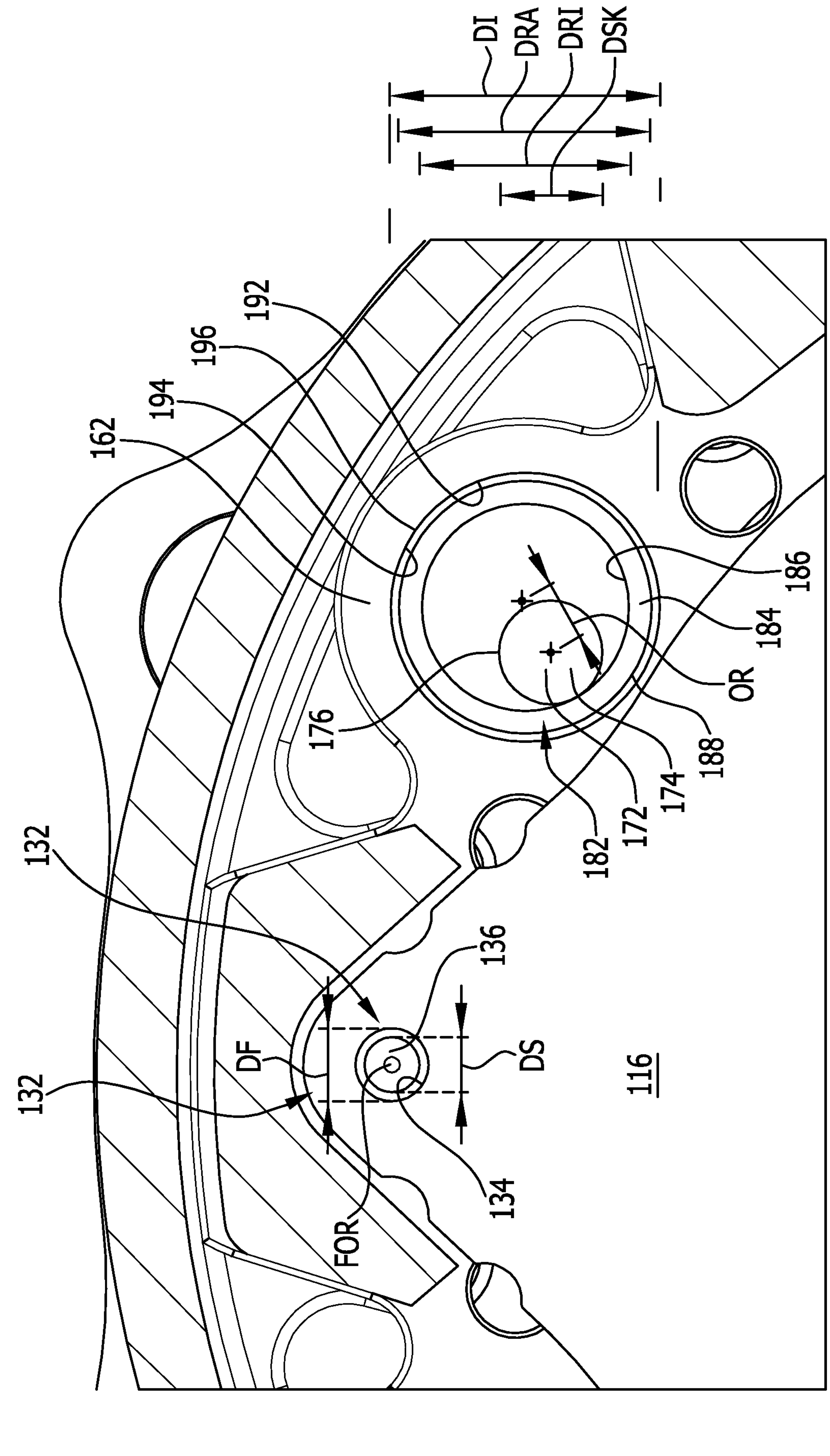
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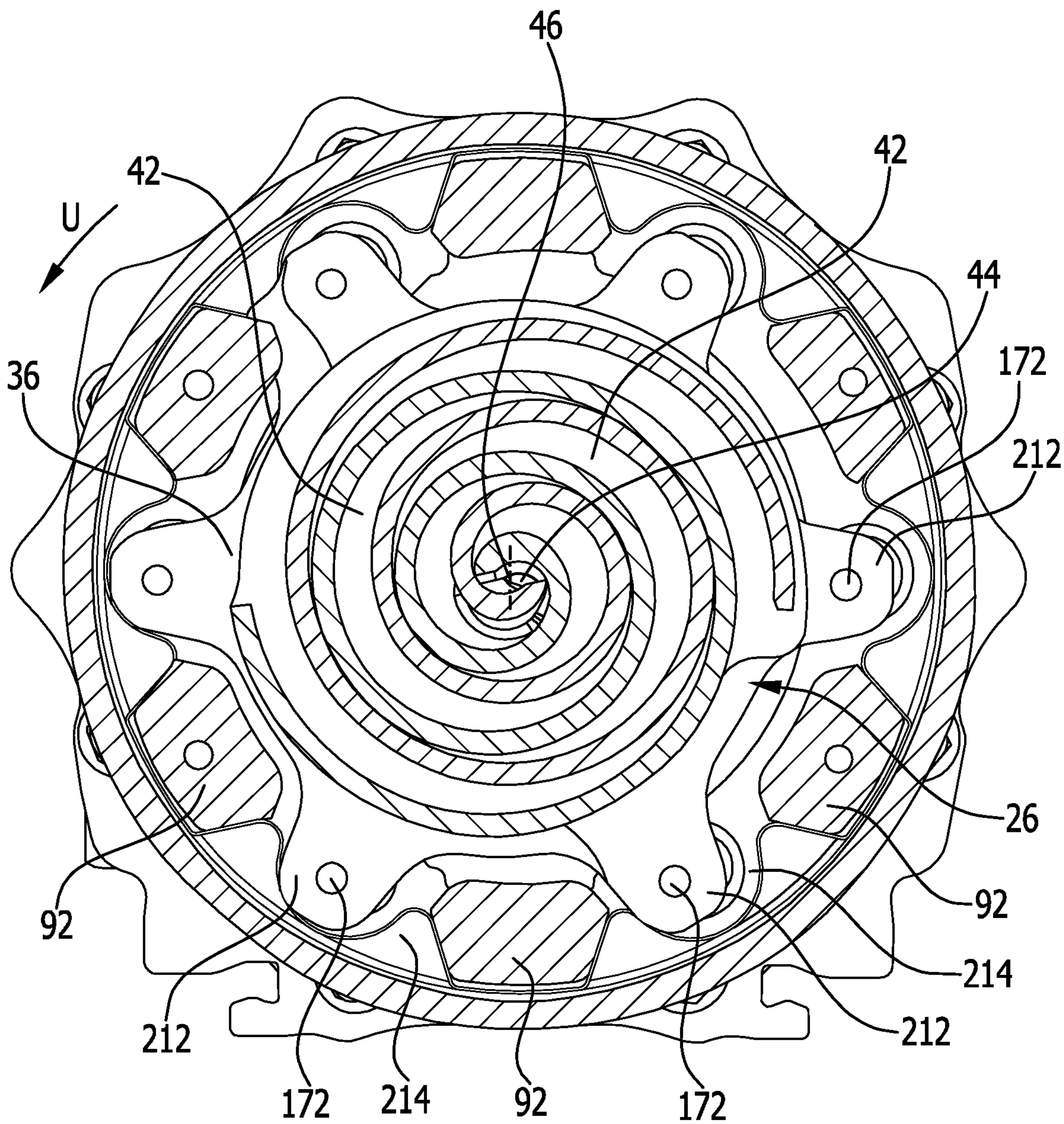
FIG.7



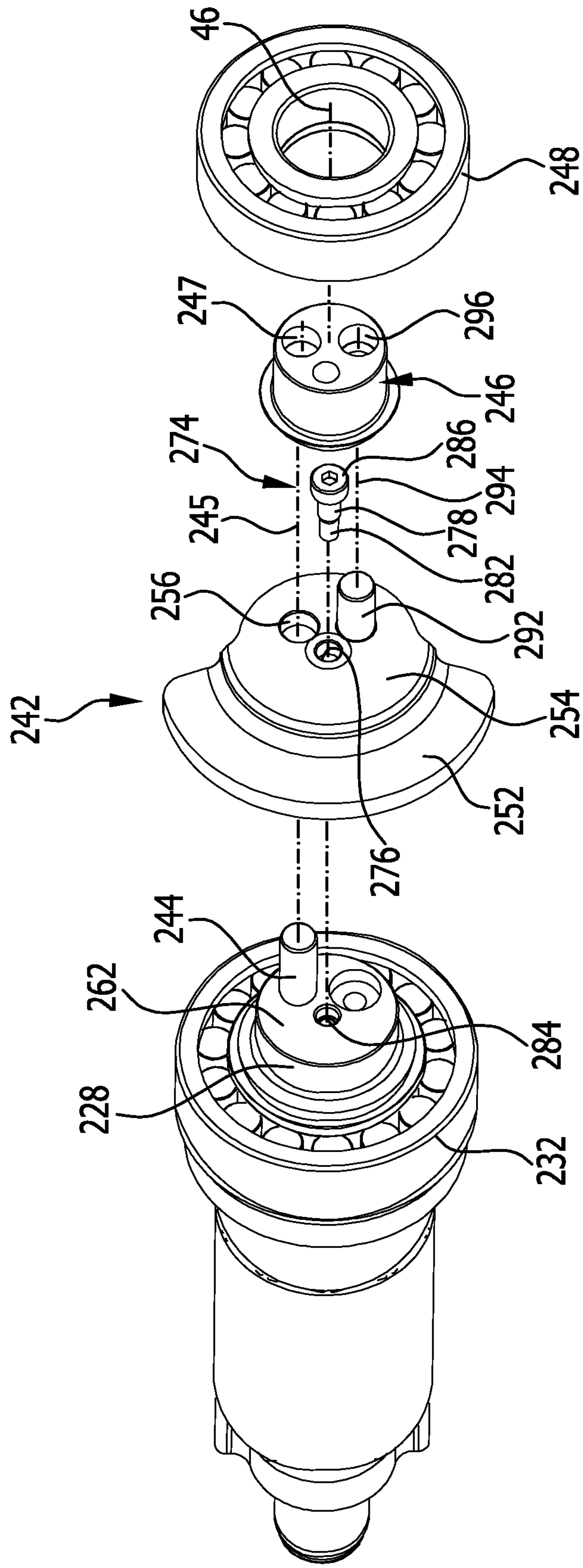

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FIG.8

FIG.9

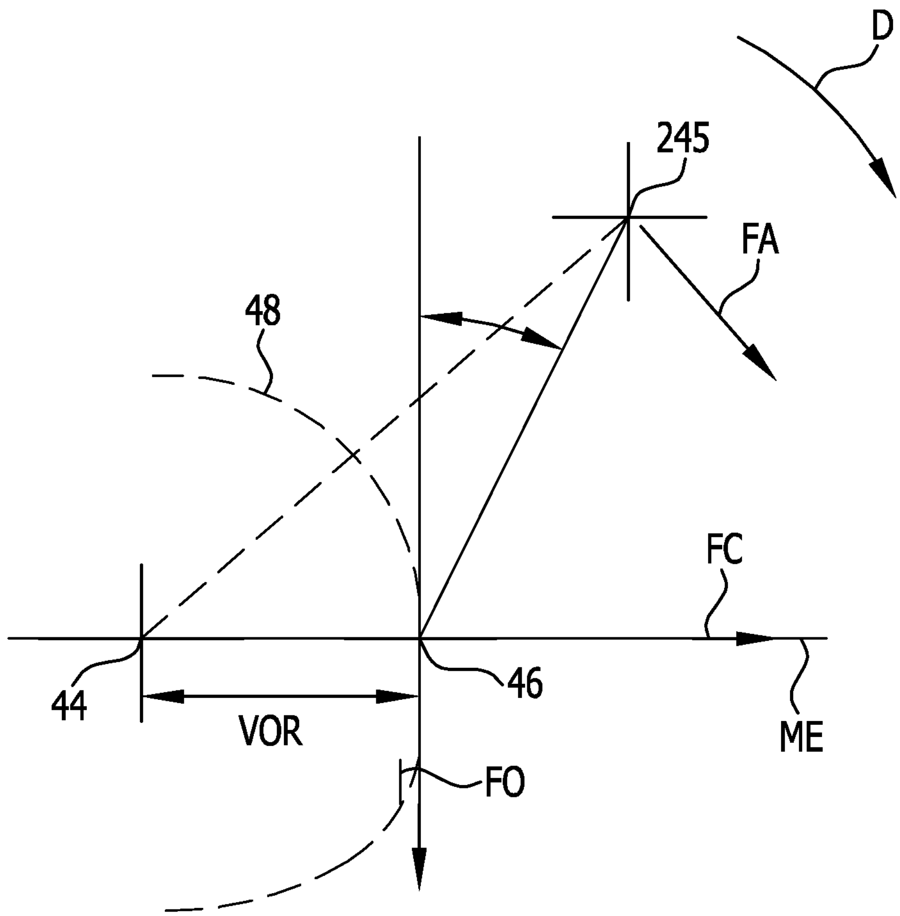

FIG.10

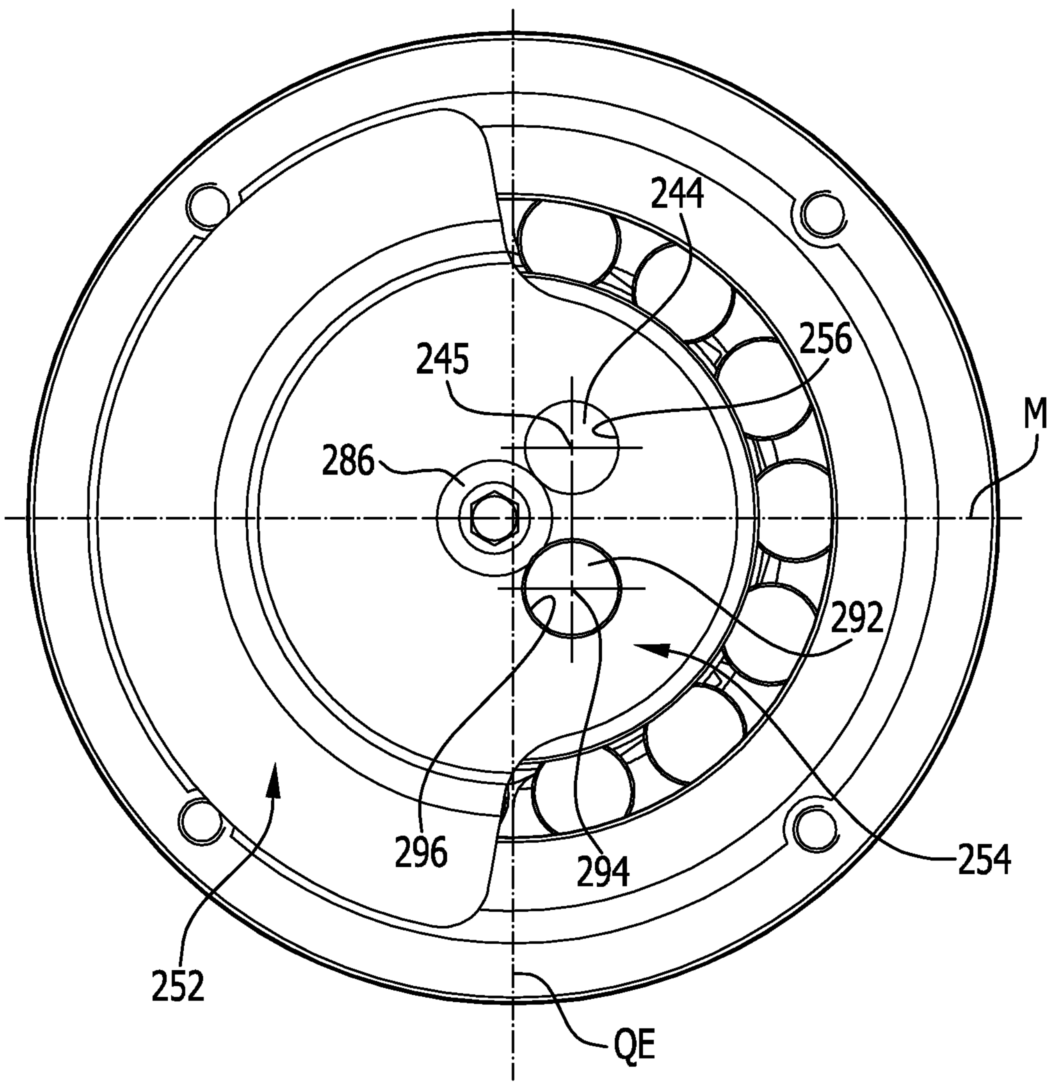

FIG.11

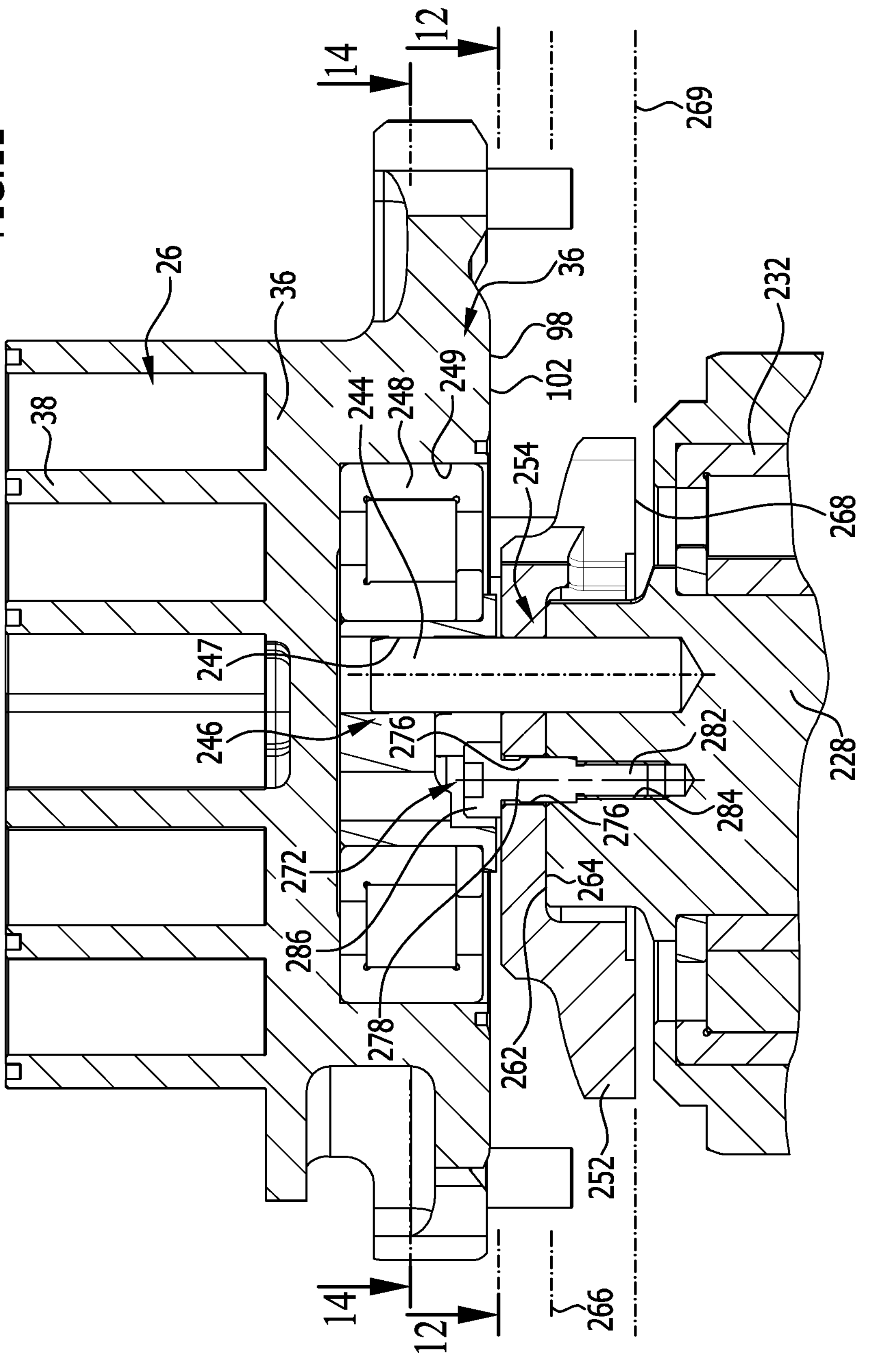
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FIG.14

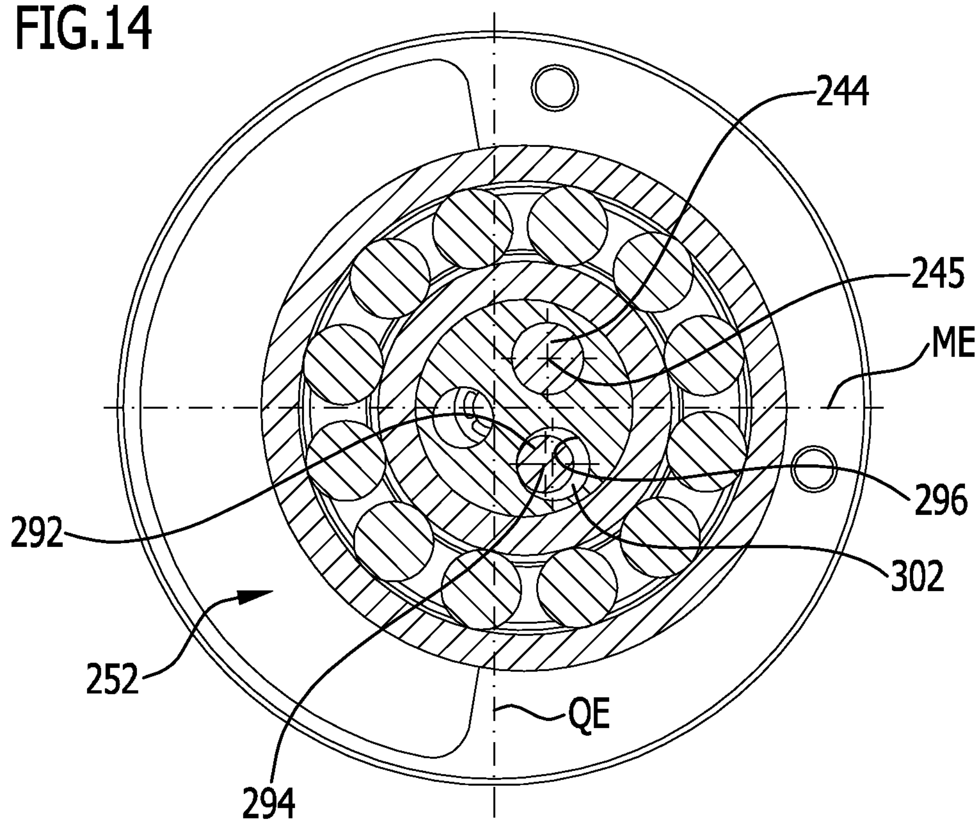
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FIG.12

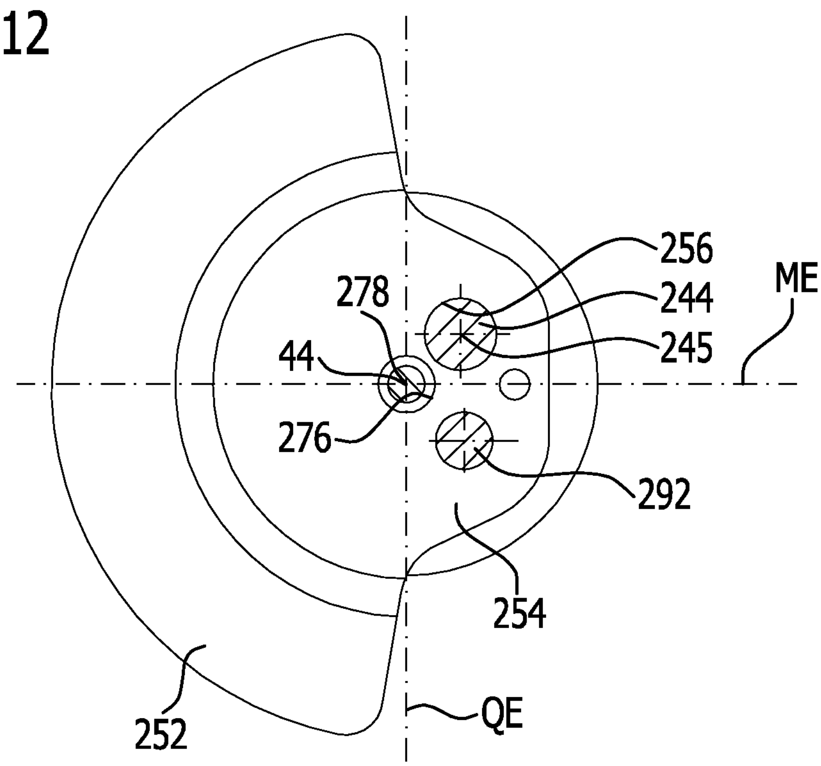
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FIG.15

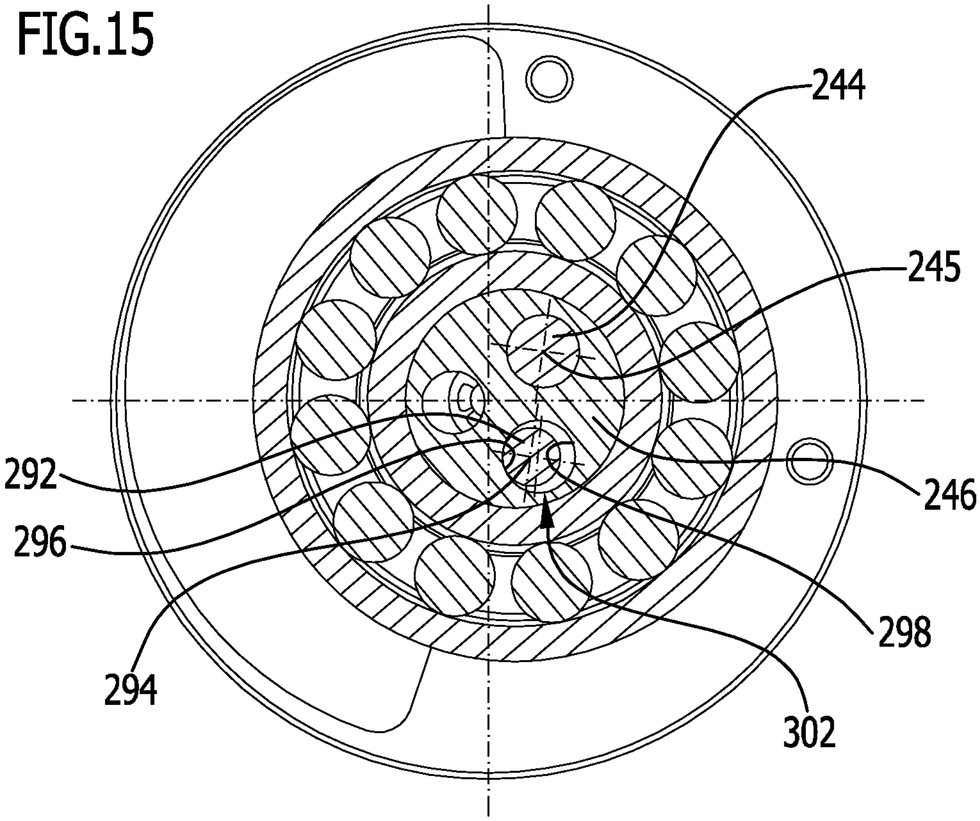
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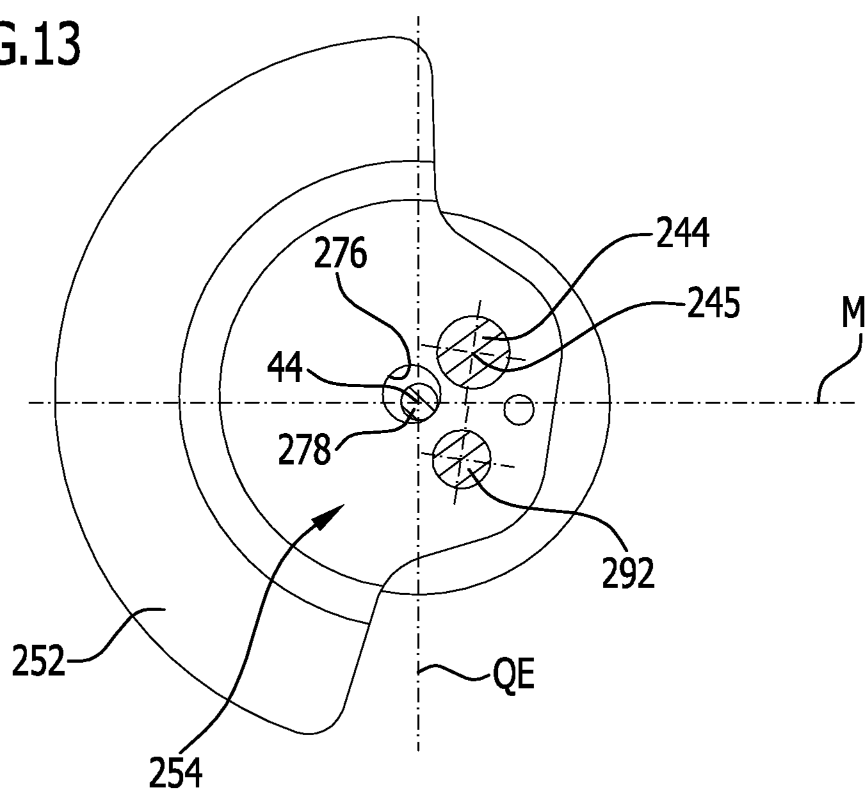
FIG.13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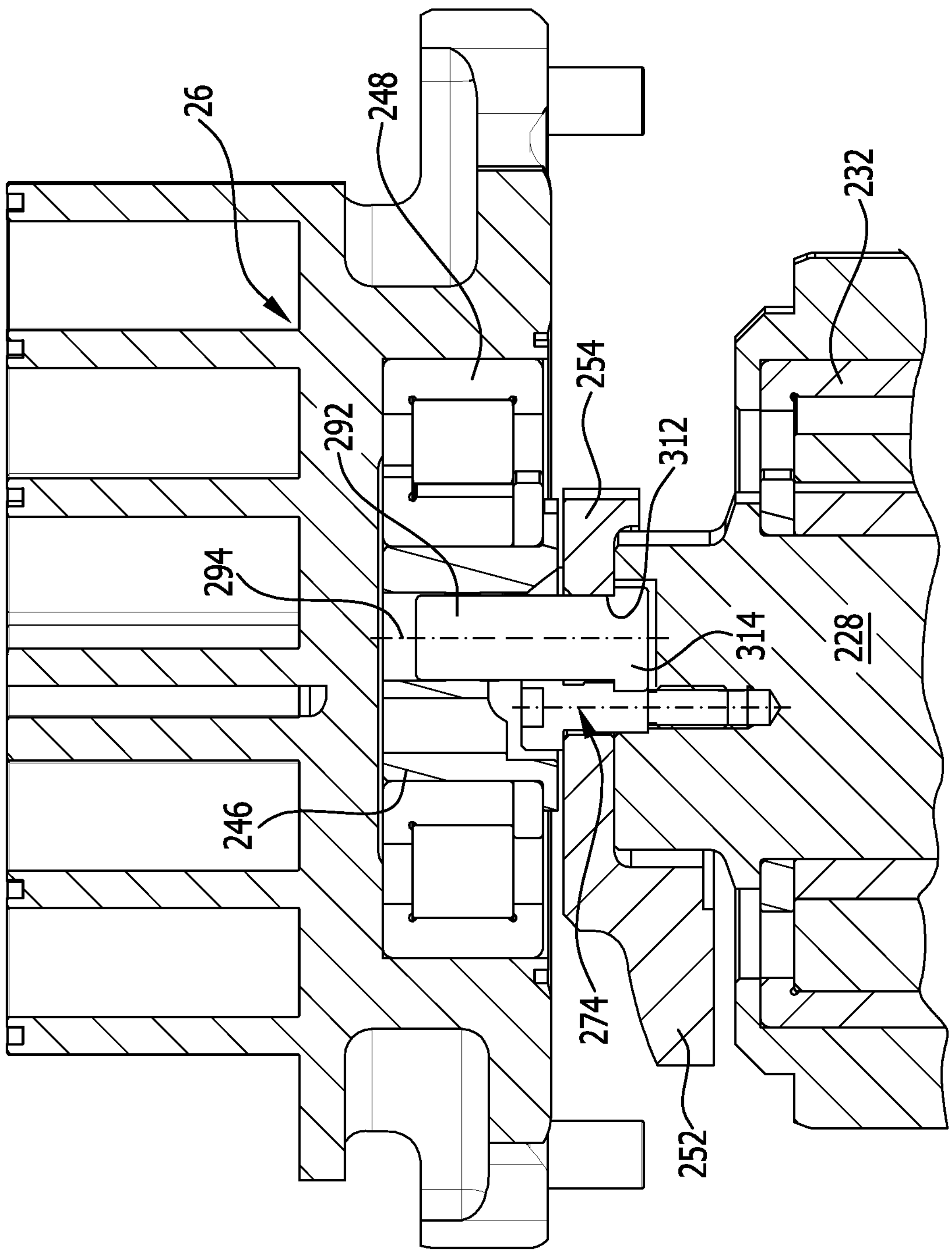
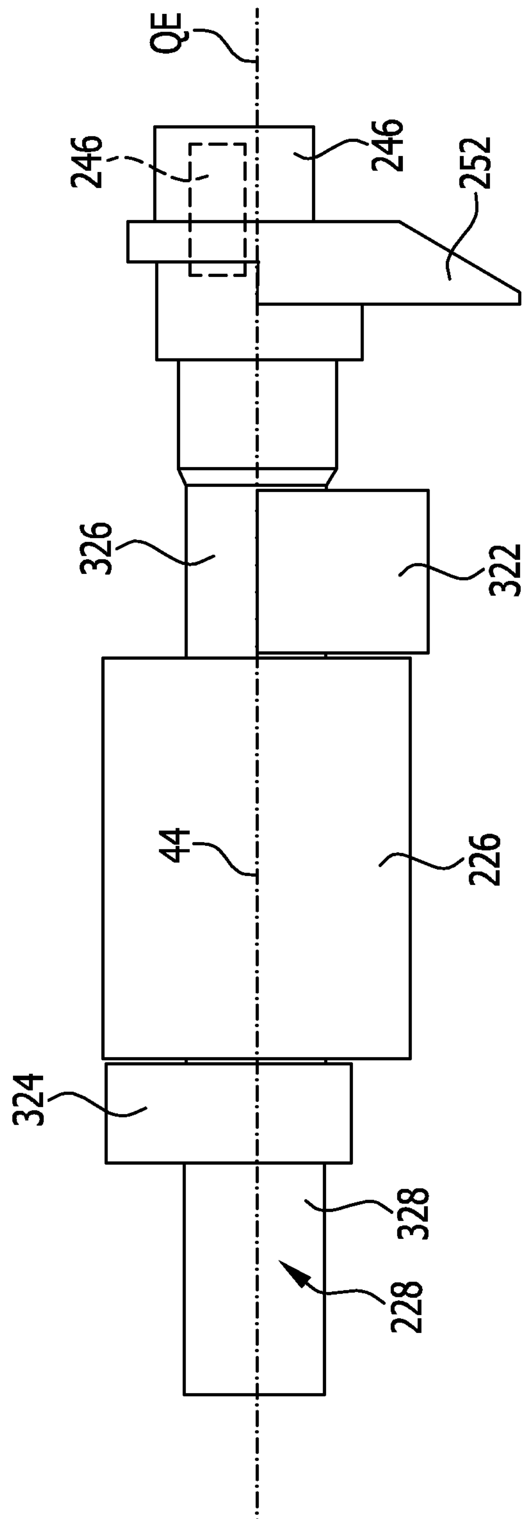


FIG.16

FIG.17



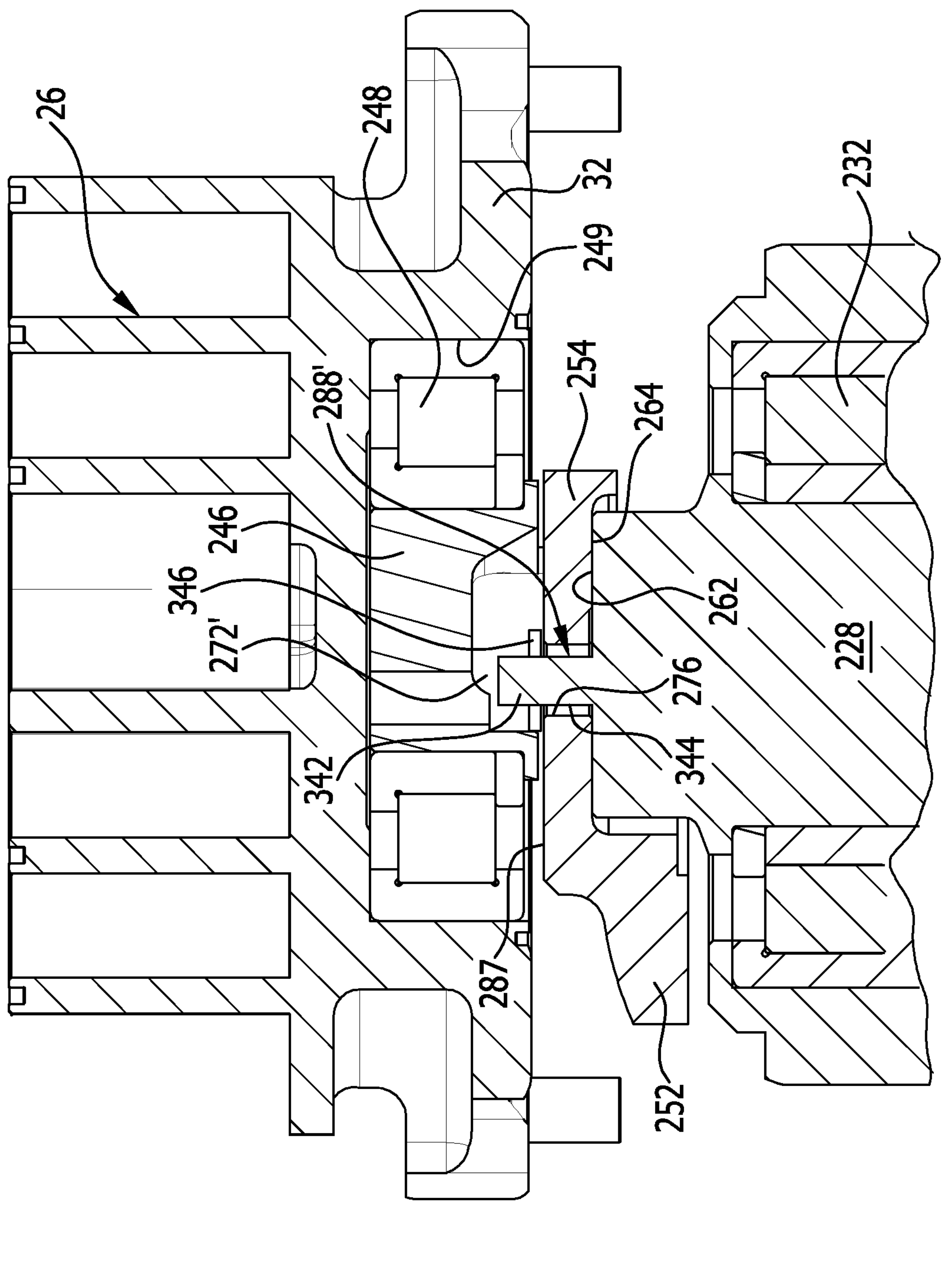

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FIG.18

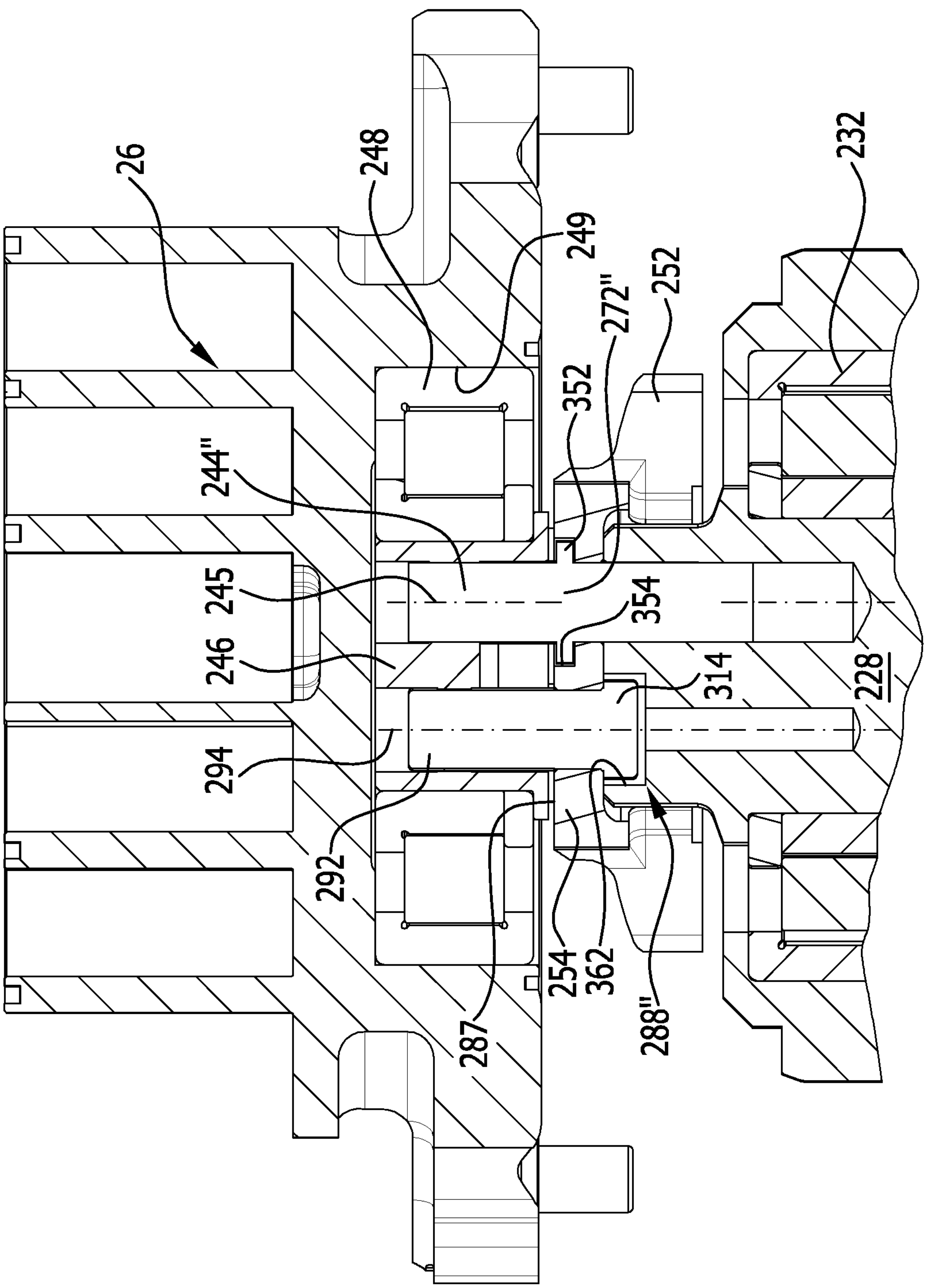
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FIG.19

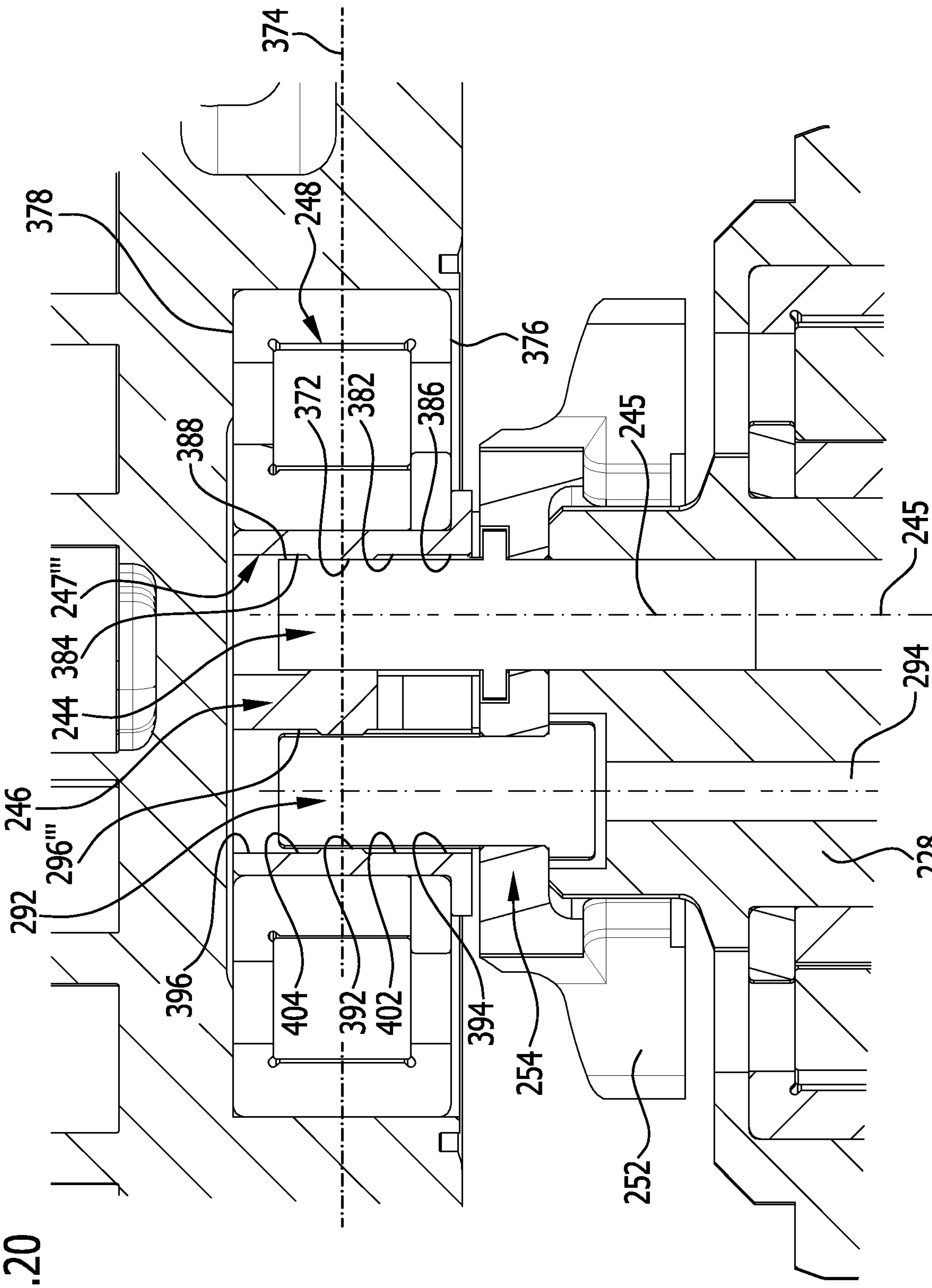
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FIG.20

SCROLL COMPRESSOR ORBITAL PATH BALANCING MASS

CROSS-REFERENCE TO RELATED PATENT APPLICATION

This application is a continuation of International application number PCT/EP2016/067943 filed on Jul. 27, 2016.

This patent application claims the benefit of International application No. PCT/EP2016/067943 of Jul. 27, 2016 the teachings and disclosure of which are hereby incorporated in their entirety by reference thereto.

BACKGROUND OF THE INVENTION

The invention relates to a compressor, comprising a compressor housing, a scroll compressor unit which is arranged in the compressor housing and comprises a first stationary compressor body and a second compressor body movable relative to the stationary compressor body, the first and second scroll ribs of which, which are each formed as an involute of a circle, engage in one another and form compressor chambers when the second compressor body is moved relative to the first compressor body on an orbital path, an axial guide which supports the movable compressor body in respect of movements in a direction parallel to a central axis of the stationary compressor body and guides the movable compressor body in the event of movements in a direction transverse to the central axis, an eccentric drive for the scroll compressor unit, said drive having a drive member which is driven by a drive motor and which revolves about the central axis of a driveshaft on the orbital path and which for its part cooperates with a drive member receptacle of the second compressor body, an orbital path balancing mass which counteracts an unbalance due to the compressor body moving on the orbital path, and a coupling preventing the second compressor body from rotating by itself.

Compressors of this kind are known from the prior art.

A drive motor for a compressor of this kind can be operated with variable rotational speed, for example by means of a converter, or can be operated at a constant rotational speed.

In these compressors there is the problem—in particular at high rotational speeds, which for example can be over 6,000 revolutions per minute—that the guidance of the drive member in the drive member receptacle has low long-term stability, in particular if a rolling element bearing, for example a cylindrical roller bearing, is provided in the drive member receptacle for mounting of the drive member.

The object of the invention is therefore to improve a compressor of the above general type in such a way that, even at high rotational speeds, the long-term stability of the guidance of the drive member in the drive member receptacle can be ensured.

SUMMARY OF THE INVENTION

In accordance with the invention, this object is achieved in a compressor of the kind described at the outset in that the orbital path balancing mass is coupled to the eccentric drive such that said mass moves on the orbital path in a manner corresponding to the movement of the drive member but is uncoupled with respect to the transmission of tilting moments to the drive member.

The solution according to the invention is thus based on the finding, which was not known from the prior art, that in the known solutions with a rigid connection of the drive member and orbital path balancing mass, at the high rotational speeds, the orbital path balancing mass acts on the drive member with high tilting moments and therefore the mounting of the drive member in the drive member receptacle, in particular when this is achieved by a rolling element bearing, for example a cylindrical roller bearing, is exposed to a high level of wear, since bearings of this kind are exposed to increased wear in situations in which tilting moments occur.

The problem encountered in the known solutions of the orbital path balancing mass acting on the drive member with tilting moments is now solved with the solution according to the invention by uncoupling the drive member from the orbital path balancing mass in such a way that said mass can no longer act on the drive member with considerable tilting moments.

With regard to the guidance of the orbital path balancing mass, no further details have as yet been provided.

In principle, it would be conceivable to mount and to guide the orbital path balancing mass relative to the driveshaft by a bearing element provided on the driveshaft.

A particularly simple solution of favorable construction provides that the orbital path balancing mass is guided on the orbital path by an eccentric drive journal acting between the drive member and the driveshaft.

This solution has the great advantage that the eccentric drive journal which is provided anyway and which is effective between the drive member and the driveshaft can be used to guide the orbital path balancing mass such that said mass follows the orbital path of the drive member, so as to bring about the necessary mass balancing on account of the eccentricity of the orbital path of the drive member on the driveshaft without any transmission of tilting moments from the orbital path balancing mass to the drive member.

Alternatively or additionally, the object stated at the outset is also achieved in accordance with the invention in that the orbital path balancing mass engages with the eccentric drive journal, in particular is mounted rotatably thereon, by means of a guide body.

In this case a particularly simple connection can be produced between the orbital path balancing mass and the eccentric drive journal.

To this end, the guide body is preferably fixedly connected to the orbital path balancing mass.

It is particularly favorable if the eccentric drive journal passes through a journal receptacle in the guide body.

A solution that is particularly favorable in terms of its construction provides that the orbital path balancing mass is guided on the driveshaft by means of a guide body cooperating with the driveshaft.

This solution creates an additional reduction of the load on the eccentric drive journal since an additional guidance of the guide body relative to the driveshaft is now also possible.

The effect of the eccentric drive journal on the guide body is thus used fundamentally to move the guide body with the orbital path balancing mass such that the orbital path balancing mass follows the orbital path of the drive member and produces the necessary mass balancing.

In particular, it is favorable here if the orbital path balancing mass is guided by the guide body engaging with the driveshaft on a path which runs in a path plane which runs parallel to an alignment plane running perpendicularly to the central axis of the driveshaft.

As a result of the interaction between the guide body and the driveshaft, it is thus achieved that any tilting moments possibly still occurring are transmitted from the orbital path balancing mass by means of the guide body to the driveshaft and therefore generate substantially no tilting moments acting on the eccentric driveshaft.

The guidance of the guide body on the driveshaft can be implemented in a wide range of ways.

A favorable solution provides that the guide body is guided by means of a guide face at an alignment face of the driveshaft.

With regard to the alignment face provided on the driveshaft, it would be conceivable for example to arrange the alignment face on a collar of the driveshaft.

A particularly simple solution, which is also stable in respect of the guidance of the guide body, provides that the alignment face provided on the driveshaft is an end face of the driveshaft.

The guide body can also be supported optimally on the alignment face if the guide body is arranged in a manner extending beyond the alignment face.

With regard to the arrangement of the guide body, it is also favorable for space-related reasons if the guide body is arranged between the alignment face of the driveshaft and the drive member.

In this case, there is the possibility to configure the eccentric drive such that it takes up a small amount of space, in spite of the provision of the guide body.

It is particularly favorable if the guide body is formed in a plate-shaped manner, that is to say has a minimal extent in the direction of the central axes compared to its extent transverse to the central axis.

In order to safeguard the guidance of the guide body by the driveshaft and in particular to ensure same where possible in all operating states, it is preferably provided that the guide body is guided relative to the driveshaft by an axial guide.

In particular, the axial guide is formed here such that it holds the guide face of the guide body in abutment against the alignment face of the driveshaft, so as to ensure a sufficiently precise guidance of the guide body and therefore of the orbital path balancing mass relative to the driveshaft.

The axial guide can be formed here in a wide range of different ways.

The axial guide is preferably formed such that it comprises an element acting on the guide body on a side opposite the guide face.

An element of this kind can be formed in a wide range of ways.

In particular, it is provided that the element is a screw head of a screw engaging in the driveshaft.

Another solution provides that the element is a retaining ring fixed relative to the driveshaft.

A further advantageous solution provides that the element is a projection arranged on the eccentric drive journal.

For example, the axial guide can be implemented by means of a screw engaging with the driveshaft and/or a collar on the eccentric drive journal and/or a journal which is molded on the driveshaft and has a retaining ring.

In order to also provide the guide body and the orbital path balancing mass with the possibility of being able to be aligned relative to the eccentric drive journal in accordance with the particular unbalance, it is preferably provided that the guide body is rotatable relative to the eccentric drive journal to a limited extent.

By means of a limited rotatability of this kind, it is ensured on the one hand that the alignment of the guide body and therefore of the orbital path balancing mass relative to the eccentric drive journal remains within the scope of a permissible rotation, for example when the compressor is stopped, but on the other hand the guide body with the orbital path balancing mass thus has the possibility to align itself in accordance with the unbalance generated by the movement of the drive member on the orbital path so as to counteract said unbalance to the best possible extent.

To this end, a first movement limiting unit is preferably effective between the driveshaft and the guide body and allows a limited free rotatability of the guide body about the eccentric journal axis.

Here, the limited free rotatability lies in the range of from 0.5° (angle degrees) to 5°, preferably in the range of from 1° to 3°.

The movement limiting unit can be provided here by independent elements.

A particularly favorable embodiment of the movement limiting unit provides that the first movement limiting unit is formed by a stop body held on the guide body or the driveshaft and a recess receiving the stop body and arranged on the driveshaft or the guide body.

A particularly advantageous solution, however, provides that the movement limiting unit is provided by the elements of the axial guide such that the axial guide on the one hand brings about the movement of the guide body in the axial direction, that is to say in the direction of the central axes either of the driveshaft or of the second movable compressor body, and on the other hand is used simultaneously as a movement limiting unit.

It is also favorable if the orbital path balancing mass is arranged on a side, opposite the eccentric drive journal, of a geometric transverse plane running perpendicularly to the mass balancing plane and through the central axis of the driveshaft.

Alternatively or additionally to the above-described features of a solution according to the invention, a further solution of the object stated at the outset provides that the eccentric drive journal is arranged in a fixed manner in the driveshaft and engages in a drive journal receptacle in the drive member, such that the drive member is driven within the drive journal receptacle by the effect of the eccentric drive journal on the drive member.

In this case it is particularly favorable if the eccentric drive journal and the drive journal receptacle cooperate in a contact region through which a central plane passes, which central plane runs in the direction of the central axis centrally of a rotary bearing for the drive member acting between the second compressor body and the drive member, and if a gap between the eccentric drive journal and drive journal receptacle is present on either side of the contact region.

Alternatively, the position of the central plane can also be defined in that it runs centrally through the rotary bearing for the drive member, perpendicularly to the eccentric journal axis and in the direction of the eccentric journal axis.

This solution has the great advantage that the eccentric drive journal acts with its force moving the drive member on the orbital path as close as possible to this central plane of the rotary bearing and thus prevents the force effect of the eccentric drive journal from leading to tilting moments acting on the drive member, which in turn would result in a reduction of the stability of the rotary bearing for the drive.

It is particularly favorable here if the eccentric drive journal and the drive journal receptacle cooperate in a central portion of the drive journal receptacle, wherein in particular the central portion is defined in that the central plane passes through it.

In particular, it is provided here that the drive journal receptacle in the central portion has a smaller diameter than end portions of the drive journal receptacle arranged on either side of the central portion and each forming a gap.

It is preferably provided here that the central portion of the drive journal receptacle extends at most over half, and even better at most over a third of the extent of the drive journal receptacle in the direction of the eccentric journal axis.

It is also preferably provided that the end portions arranged on either side of the central portion differ at most by a factor of 2 in respect of their extent in the direction of the eccentric journal axis.

It is hereby ensured that the contact region in which the eccentric drive journal acts on the drive journal receptacle is located as close as possible to the central plane.

Alternatively or additionally to the above-describe solutions, a particularly favorable solution provides that the orbital path balancing mass is coupled by means of a coupling body to the drive member so as to also be rotated by the drive member in the event of rotation of the drive member about the eccentric drive journal.

The advantage of this solution can therefore be considered that the orbital path balancing mass is thus always disposed such that it compensates the eccentric movement, caused by the arrangement and disposition of the drive member, of the movable compressor body together with the drive member and the drive member receptacle.

This can be particularly easily implemented in that the coupling body is effective between the guide body and the drive member.

Here, the coupling body is preferably arranged fixedly on either of the guide body or drive member and engages in a recess in the other of the guide body or drive member.

It is preferably provided here that the coupling body is arranged in the recess with play.

A play of this kind is advantageously provided if both the guide body with the orbital path balancing mass and the drive member are in each case arranged rotatably relative to the eccentric drive journal and therefore the coupling body is to be arranged at a spacing from the eccentric drive journal such that an absence of play between the coupling body and the recess would thus result in an over-determination of the connection between the position of the coupling body and the recess relative to the eccentric drive journal.

The provided play thus avoids the over-determination and is also used in addition to facilitate the lubrication.

Here, in particular the coupling body and the recess are arranged such that the coupling body in normal operation of the compressor abuts against a portion of a wall face of the recess and consequently a defined alignment of the orbital path mass relative to the drive member is still provided even without an over-determined positioning of the coupling body and recess.

A particularly advantageous solution provides that the coupling body is formed as a coupling journal, with which the connection for co-rotation between the orbital path balancing mass and the drive member can be provided in a simple way.

An advantageous development of the solution according to the invention also provides that the coupling journal is arranged fixedly on the guide body and engages in the recess in the drive member.

In order to prevent tilting moments from acting on the drive member via the coupling journal, it is preferably provided that the coupling journal and the recess cooperate in a contact region through which a central plane passes, which central plane runs perpendicularly to the journal axis of the coupling journal and runs in the direction of the coupling journal centrally of a rotary bearing for the drive member effective between the second compressor body and the drive member, and that a gap between the coupling journal and the recess is provided on either side of the contact region.

A transmission of tilting moments can thus largely be avoided in the same way as with the drive of the drive member by the eccentric drive journal.

In particular, it is preferably provided here that the coupling journal and the recess cooperate in a central section of the recess.

This can be implemented easily for example in that the recess in the central portion has a smaller diameter than in the end portions of the recess arranged on either side of the central portion and each forming a gap.

With regard to the extent of the central portion, likewise no further details have been provided in conjunction with the above descriptions.

It is preferably provided that the central portion of the recess extends at most over half of the extent of the recess in the direction of the journal axis.

It is also preferably provided that the end portions arranged on either side of the central portion differ at most by a factor of 2 in respect of their extent in the direction of the journal axis.

The object stated at the outset is also achieved alternatively or additionally to the previously described solutions in that the eccentric drive comprises the eccentric drive journal driving the drive member and comprises a coupling body coupling the orbital path balancing mass to the drive member.

It is particularly advantageous in this context if the coupling body also constitutes a mass balancing body. With this solution it is possible in a simple way to compensate in particular the unbalance of the eccentric drive journal, which is caused by the eccentric drive journal and is asymmetrical with respect to the mass balancing plane, and therefore to improve the smooth running of the compressor.

An advantageous solution thus provides that the eccentric drive journal and the coupling body are arranged on mutually opposed sides of a mass balancing plane such that, besides the coupling of the orbital path balancing mass to the drive member, the unbalance caused by the eccentric drive journal is also compensated in a simple way and the smooth running is improved.

With regard to the course of the mass balancing plane, likewise no further details have as yet been provided.

An advantageous solution thus provides that the mass balancing plane runs through the central axis of the driveshaft and the central axis of the compressor body movable in an orbiting manner and is defined in an exact manner by these two central axes in respect of its position and orientation.

In order to achieve maximal smooth running, it is preferably provided that the coupling body has a mass which deviates at most by 20%, even better at most by 10%, from the mass of the eccentric drive journal so as to achieve the greatest possible compensation of the unbalance caused by the eccentric drive journal.

It is also preferably provided that the coupling body has substantially the same mass, in particular the same mass, as the eccentric drive journal.

So as to also create identical conditions as in the eccentric drive journal to the greatest possible extent in respect of the mass distribution, it is preferably provided that the coupling body is configured as a mass balancing journal.

With regard to the arrangement of the axes of the mass balancing journal and of the eccentric drive journal, it is preferably provided that a journal axis of the mass balancing journal is arranged at the same spacing from the mass balancing plane as an eccentric journal axis of the eccentric drive journal.

Likewise, no further details have as yet been provided in respect of the orientation of the axes.

It is particularly favorable if the journal axis of the mass balancing journal runs substantially parallel, preferably parallel, to the eccentric drive axis of the eccentric journal.

It is also particularly favorable if the journal axis of the mass balancing journal and the eccentric journal axis of the eccentric journal run parallel to the mass balancing plane.

With regard to the arrangement of the mass balancing journal, no further details have as yet been provided.

For example, it would be conceivable to arrange the mass balancing journal on the driveshaft or on the drive member.

A particularly favorable solution provides that the mass balancing journal is held on the guide body of the orbital path balancing mass and therefore moves together therewith and is aligned relative to the eccentric drive journal.

In the case in which the mass balancing body is configured as a mass balancing journal it is also preferably provided that the mass balancing journal engages in the recess provided in the drive member.

Within the scope of the solution according to the invention, no further details regarding the overall performed unbalance compensation have been described.

In particular, it is provided here that the above-described orbital path balancing mass is arranged symmetrically to the mass balancing plane and therefore does not bring about any asymmetrical unbalance relative to the mass balancing plane.

A particularly favorable solution also provides that the orbital path balancing mass is arranged on a side, opposite the eccentric drive journal and the mass balancing body, of a geometric transverse plane running perpendicularly to the mass balancing plane and through the central axis of the driveshaft.

With regard to a further unbalance compensation, in particular of the driveshaft, likewise no further details have as yet been provided in conjunction with the solutions described hitherto.

An advantageous solution thus provides that the driveshaft has a portion facing the compressor, which portion carries an unbalance compensation mass facing the compressor and carries the eccentric drive journal and in particular guides the mass balancing body and the orbital path balancing mass.

The unbalance compensation mass is preferably arranged on the driveshaft between a rotor of the drive motor and a front bearing unit.

A favorable solution also provides that the driveshaft has a portion facing away from the compressor, which portion carries an unbalance compensation mass facing away from the compressor.

It is preferably provided in the case of this unbalance compensation mass as well that said mass is arranged between the rotor of the drive motor and a rear bearing unit of the driveshaft.

Likewise in the case of these unbalance compensation masses, which are arranged on the driveshaft, it is preferably provided that they are likewise formed and arranged symmetrically with respect to the mass balancing plane.

Further features and advantages of the invention are the subject of the following description and illustration in the drawings of a number of exemplary embodiments.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** a perspective illustration of a first exemplary embodiment of a compressor according to the invention;

FIG. **2** a longitudinal section along line **2-2** in FIG. **4**;

FIG. **3** a schematic illustration of scroll ribs engaging in one another and of the orbiting movement of one of the scroll ribs and an illustration of the orbital path of the movable scroll rib relative to the stationary scroll rib;

FIG. **4** a section along line **4-4** in FIG. **2**;

FIG. **5** a section along line **5-5** in FIG. **2**;

FIG. **6** an enlarged illustration of a region A in FIG. **5**;

FIG. **7** a section along line **7-7** in FIG. **2**;

FIG. **8** an exploded illustration of the cooperation between an eccentric drive journal of an orbital path balancing mass and a drive member in the compressor according to the invention;

FIG. **9** a schematic geometric illustration of the relative position of the central axes of the compressor bodies and of an eccentric journal axis;

FIG. **10** a plan view of a guide body with the orbital path balancing mass in its position on the driveshaft with eccentric drive journal passing through the guide body;

FIG. **11** an enlarged section along line **11-11** in FIG. **4**;

FIG. **12** a section along line **12-12** in FIG. **11**, but only with illustration of the unbalance compensation mass and the guide body;

FIG. **13** a section similar to FIG. **12** with active first movement limiting unit;

FIG. **14** a section along line **14-14** in the region of a drive member receptacle of the movable compressor body with a drive member in FIG. **11** in the position according to FIG. **12**;

FIG. **15** a section similar to FIG. **14** in the position according to FIG. **13**;

FIG. **16** an enlarged section along line **16-16** in FIG. **4** through a mass balancing journal;

FIG. **17** a side view of a driveshaft with the drive member driven thereby;

FIG. **18** an enlarged section along line **18-18** in FIG. **4** through a second exemplary embodiment of a compressor according to the invention;

FIG. **19** a section similar to FIG. **11** through a third exemplary embodiment of a compressor according to the invention; and

FIG. **20** a section similar to FIG. **11** through a fourth exemplary embodiment of a compressor according to the invention.

DETAILED DESCRIPTION OF THE INVENTION

A first exemplary embodiment, shown in FIG. **1**, of a compressor according to the invention denoted as a whole by **10**, said compressor being intended for a gaseous medium, in particular a refrigerant, comprises a compressor housing denoted as a whole by **12**, which compressor housing has a first end-side housing portion **14**, a second end-side housing portion **16**, and an intermediate portion **18** arranged between the end-side housing portions **14** and **16**.

As shown in FIG. **2** to FIG. **7**, a scroll compressor unit denoted as a whole by **22** is provided in the first housing portion **14** and has a first stationary compressor body **24** in the compressor housing **12**, in particular in the first housing portion **14**, and has a second compressor body **26**, which is movable relative to the stationary compressor body **24**.

The first compressor body **24** comprises a compressor body base **32**, from which a first scroll rib **34** is raised, and the second compressor body **26** likewise comprises a compressor body base **36**, from which a second scroll rib **38** is raised.

The compressor bodies **24** and **26** are arranged relative to one another such that the scroll ribs **34**, **38**, as shown in FIG. **3**, engage in one another so as to form therebetween at least one compressor chamber, preferably a plurality of compressor chambers **42**, in which the gaseous medium, for example refrigerant, is compressed in that the second compressor body **26** moves with its central axis **46** about a central axis **44** of the first compressor body **24** on an orbital path **48** with a compressor orbital path radius VOR, wherein the volume of the compressor chambers **42** is reduced and finally compressed gaseous medium exits through a central outlet **52** (FIG. **2**), whereas gaseous medium to be drawn in is drawn in radially outwardly in relation to the central axis **44** through compressor chambers **42** that are open on the peripheral side.

The compressor chambers **42** are sealed relative to one another in particular also in that the scroll ribs **34**, **38** are provided on the end face with axial sealing elements **54** and **58**, which abut tightly against the corresponding base face **62**, **64** of the other compressor body **26**, **24** respectively, wherein the base faces **62**, **64** are formed by the respective compressor body bases **36** and **32** and in each case lie in a plane running perpendicularly to the central axis **44**.

The scroll compressor unit **22** is received as a whole in a first housing body **72** of the compressor housing **12**, which comprises an end-face cover portion **74** and a cylindrical ring portion **76**, which is molded integrally on the end-face cover portion **74** and which for its part engages by means of an annular projection in a sleeve body **82** of the housing body **72**, which is molded on a central housing body **84** forming the intermediate portion **18**, wherein the central housing body **84** is closed on a side opposite the first housing body **72** by a second housing body **86**, which forms an inlet chamber **88** for the gaseous medium.

The sleeve body **82** here surrounds the scroll compressor unit **22**, the first compressor body **24** of which is supported by means of support fingers **92**, molded on the compressor body base **32**, on a bearing face **94** in the housing body **72**.

In particular the first compressor body **24** is fixed immovably in the housing body **72** with respect to all movements parallel to the contact face **94**.

The first compressor body **24** is thus fixed in a stationary manner in an exactly defined position within the first housing body **72** and thus also within the compressor housing **12**.

The second movable compressor body **26**, which must move on the orbital path **48** about the central axis **44** relative to the first compressor body **24**, is guided, based on the central axis **44**, in the axial direction by an axial guide denoted as a whole by **96**, which axial guide supports and guides the compressor body base **36** on an underside **98** facing away from the scroll rib **38**, more specifically in the region of an axial support face **102**, such that the compressor body base **36** of the second compressor body **26** is supported relative to the first compressor body **24**, which is positioned in a stationary manner in the compressor housing **12**, and in a direction parallel to the central axis **44**, in such a way that the axial sealing elements **58** remain on the base face **64** and do not lift therefrom, wherein at the same time the compressor body base **36** with the axial support face **102** can move in a sliding manner transversely to the central axis **44** relative to the axial guide **96** (FIGS. **2** and **4**).

To this end, as shown in FIG. **2**, the axial guide **96** is formed by a carrier element **112** which has a carrier face **114** facing the axial support face **102** (FIGS. **2** and **5**), wherein, however, the compressor body base **36** does not abut on said carrier face by means of the axial support face **102**, and instead a sliding body **116** denoted as a whole by **116** and formed in particular in a plate-shaped manner abuts on said carrier face by means of a sliding contact face **118**, wherein the sliding body **116** with a sliding support face **122** opposite the sliding contact face **118** (FIGS. **2** and **5**) supports the axial support face **102** (FIGS. **2** and **4**) with respect to movements parallel to the central axis **44**, but guides it in a supported manner slidingly in respect of movements transverse to the central axis **44**.

So that an axial movement of the second compressor body **26** in the direction of the central axis **44** is prevented however, a movement in a plane transverse to, in particular perpendicular to the central axis **44** is made possible.

The axial guide **96** according to the present invention provides that, in the event of a movement of the second compressor body **26** on the orbital path **48** about the central axis **44** of the first compressor body **24**, on the one hand the second compressor body **26** moves with the compressor body base **36** and the axial support face **102** thereof relative to the sliding body **116**, wherein on the other hand the sliding body **116** for its part moves in turn relative to the carrier element **118**.

There is thus a sliding between the compressor body base **36** and the sliding body **116** by a movement of the axial support face **102** relative to the sliding support face **122** of the sliding body **116**, and in addition there is a sliding of the sliding contact face **118** of the sliding body **116** relative to the carrier face **114** of the carrier element **112**.

In order to predefine the limited two-dimensional movability of the sliding body **116** parallel to a plane perpendicular to the central axis **44** relative to the carrier element **112**, the sliding body **116** is guided relative to the carrier element **112** with play by a guide shown in FIGS. **5** and **6** and denoted as a whole by **132**, wherein the guidance with play **132** comprises a guide recess **134** provided in the sliding body **116**, which recess has a diameter DF, and comprises a guide pin **136** anchored in the carrier element **112**, the diameter DS of said guide pin being smaller than the diameter DF, such that half of the difference DF-DS defines a guide orbital radius with which the sliding body **116** can perform an orbiting movement relative to the carrier element **112**.

As a result of the movements of the sliding body **116**, a sufficient lubricating film builds up between the axial support face **102** of the compressor body base **36** and the sliding support face **122** of the sliding body **116**, and between the carrier face **114** and the sliding contact face **118**.

For a stable lubricating film it is sufficient if the guide orbital radius FOR is 0.01 times the compressor orbital radius or more, in particular 0.05 times the compressor orbital radius or more.

For example, on account of the fact that the carrier element **112** is produced from an aluminum alloy at least in the region of the carrier face **114**, an improved lubrication is also additionally ensured in that lubricant infiltrates the pores of the carrier element **112** and is thus available for the build-up of the lubricating film in the gap via the surface structures of the carrier element **112** for example provided in the region of the carrier face **114**.

Since the sliding body **116** itself is formed as a plate-shaped, annular part made of spring steel and therefore the sliding contact face **118** facing the carrier face **114** is a smooth spring steel surface, the formation of the lubricating film is additionally promoted.

Furthermore, the material pairing of the aluminum alloy, which in the region of the carrier face **114** is softer than spring steel, and of the spring steel in the region of the sliding contact face **118** has advantageous properties for smooth running on account of the resistance to wear.

In the solution according to the invention the carrier element **112** is not only provided with the carrier face **114**, on which the sliding body **116** abuts, but also with the contact faces **94** on which the support fingers **92** of the first compressor body **24** are supported.

It is thus possible to fix the position of the first compressor body **24** and the position of the second compressor body **26** in the direction of the central axis **44** relative to one another by suitable construction of the carrier element **112**, wherein this is achieved in particular by a single face of the carrier element **112**, which comprises both the carrier face **114** and the contact faces **94**.

Furthermore (as shown in FIGS. **2** and **4** to **6**), the non-rotatable fixing of the support fingers **92** relative to the carrier element **112** is achieved both by the carrier element **112** and also the positioning pins **142** passing through the support fingers **92**.

The carrier element **112** is also arranged in the housing body **72** in a manner fixed both axially in the direction of the central axis **44** and in respect of rotary movements about the central axis **44**.

So as to also ensure the build-up of a lubricating film formed of lubricant between the sliding support face **122** and the axial support face **102**, the compressor body base **36** is provided in a radially inner edge region **152** and in a radially outer edge region **154** with edge faces **156** and **158** running at an incline relative to the axial support face **102** and set back in relation to the axial support face **102**, which edge faces together with the sliding contact face **122** each lead to a gap opening radially outwardly or inwardly, respectively, in a wedge-shaped manner, said gaps facilitating the entry of lubricant.

The build-up of the lubricating film between the sliding support face **122** and the axial support face **102** is also promoted in that the sliding support face **122** and the axial support face **102**, in the overlap region in which they cooperate, are formed as continuous ring faces **124** and **126**, i.e. as ring faces not interrupted in the circumferential direction U about the central axis or over their entire radial extent, wherein in particular the ring face **126** of the axial support face **102** extends starting from an inner contour IK with a radius IR to an outer contour AK, wherein the radius IR is less than two thirds of an outer radius AR.

The ring face **124** of the sliding support face **122** is also dimensioned such that the ring face **126** of the axial support face **102** always abuts on it over the entire surface in the event of all movements relative to the sliding support face **122**.

As is shown in FIGS. **2** to **6**, the axial support face **102** and the sliding support face **122** cooperating therewith and also the carrier face **114** and the sliding contact face **118** cooperating therewith all lie radially within a coupling **164** comprising a plurality of coupling element sets **162**, which are arranged at equal radial spacings from the central axis **44** and at equal angular spacings in the circumferential direction U about the central axis **44** and together form a coupling **164** which prevents the second movable compressor body **26** from rotating by itself.

Each of these coupling element sets **162**, as shown in FIGS. **2**, **6** and **7**, comprises a pin body **174** as first coupling element **172**, which pin body has a cylindrical lateral surface **176** and by means of this cylindrical lateral surface **176** engages in a second coupling element **182**.

The second coupling element **182** is formed by an annular body **184** which has a cylindrical inner face **186** and a cylindrical outer face **188** which are arranged coaxially with one another.

This second coupling element **182** is guided in a third coupling element **192** which is formed as a receptacle **194** for the annular body **184**, is provided in the carrier element **112** and has a cylindrical inner wall face **196**.

Here, the diameter DI of the inner wall face **196** is in particular greater than the diameter DRA of the cylindrical outer face **188** of the annular body **184**, and the diameter DRI of the cylindrical inner face **186** is necessarily smaller than the diameter DRA of the cylindrical outer faces **188** of the annular body **184**, wherein in addition the diameter DRI of the cylindrical inner face **186** is greater than a diameter DSK of the cylindrical lateral surface **176** of the pin body **174**.

Each coupling element set **162** thus for its part forms an orbital guide, the maximum orbital radius OR of which for the orbiting movement corresponds to $DI/2-(DRA-DRI)/2-DSK/2$.

As a result of the dimensioning of the orbital radius OR of the coupling element sets **162** in such a way that said radius is slightly greater than the compressor orbital path radius VOR, defined by the compressor bodies **24** and **26** of the scroll compressor unit **22**, the movable compressor body **26** is guided relative to the stationary compressor body **24** by the coupling **164** in such a way that in each case one of the coupling element sets **162** is effective in order to prevent the second movable compressor body **26** from rotating by itself, wherein, for example with six coupling element sets **162**, when an angular range of 60° has been passed through, the efficiency of each coupling element set **162** changes from one coupling element set **162** to the coupling element set **162** following next in the direction of rotation.

On account of the fact that each coupling element set **162** comprises three coupling elements **172**, **182** and **192** and in particular an annular body **184** between the particular pin body **174** and the particular receptacle **194**, on the one hand the wear resistance of the coupling element sets **162** is improved, on the other hand the lubrication in the region thereof is improved, and in addition the production of noise by the coupling element sets **162** created by the change of efficiency from one coupling element set **172** to the other coupling element set **162** is also reduced.

Here, it is in particular essential that the coupling element sets **162** experience a sufficient lubrication, in particular a lubrication between the cylindrical lateral surface **176** of the pin body **174** and the cylindrical inner face **186** of the annular body **184** as well as a lubrication between the cylindrical outer face **188** of the annular body **184** and the cylindrical inner wall face **196** of the receptacle **194**.

For optimal lubrication of the coupling element sets **162**, the receptacles **194** in the carrier element **112** are open on both sides in the axial direction, wherein the annular bodies **184** are held on their sides facing away from the second compressor body **26** by a radially inwardly protruding stop element **198**.

In addition, further through-openings **202**, **204** are also provided in the carrier element **112** and allow a passage of lubricant and drawn-in refrigerant.

In order to receive the coupling elements **172** formed as pin bodies **174**, the compressor body base **36** is provided with star-shaped extensions **212** extending radially outwardly, which extensions engage in gaps **214** between support fingers **92** arranged in succession in a circumferential direction U about the central axis **44**, such that the coupling elements **172** likewise lie in these gaps **214** and thus are arranged within the housing body **72** at the greatest possible radial spacing from the central axis **44** (FIG. **7**).

This positioning of the coupling element sets **162**, predefined by the greatest possible radial spacing of the coupling elements **172**, likewise at the greatest possible radial spacing from the central axis **44** has the advantage that, on account of the large lever arm, the forces acting on the coupling element sets **162** can thus be kept as small as possible, which has an advantageous effect on the component dimensioning.

The concept according to the invention of lubricating the axial guide **96** and the coupling element sets **162** is in particular advantageous if the central axes **44** and **46** of the compressor bodies **24** and **26** run horizontally in the normal case, that is to say at most with an angle of 30° to the horizontal, wherein a lubricant bath **210** forms in the compressor housing **12**, in particular in the region of the first housing body **72** at the deepest point in the direction of the force of gravity, from which bath lubricant is swirled up during operation and in so doing is collected and distributed in the described way.

The drive of the movable compressor body **24** is achieved (as shown in FIG. **2**) by a drive motor denoted as a whole by **222**, for example an electric motor, which in particular comprises a stator **224** held in the central housing body **84** and a rotor **226** arranged within the stator **224**, which rotor is arranged on a driveshaft **228** which runs coaxially with the central axis **44** of the stationary compressor body **24**.

The driveshaft **228** is on the one hand mounted in a bearing unit **232** facing the compressor and arranged between the drive motor **222** and the scroll compressor unit **22** and in the central housing body **84**, and on the other hand in a bearing unit **234** facing away from the compressor and arranged on a side of the drive motor **222** opposite the bearing unit **232**.

The bearing unit **234** facing away from the compressor is mounted here for example in the second housing body **86**, which closes off the central housing body **84** on a side opposite the first housing body **72**.

Drawn-in medium, in particular the refrigerant, flows here from the inlet chamber **88** formed by the second housing body **86**, through the drive motor **222** in the direction of the bearing unit **232** facing the compressor, flows around said bearing unit, and then flows in the direction of the scroll compressor unit **22**.

The driveshaft **228** drives the movable compressor body **26** via an eccentric drive denoted as a whole by **242**, which compressor body moves in an orbiting manner about the central axis **44** of the stationary compressor body **24**.

The eccentric drive **242** comprises in particular an eccentric drive journal **244**, which is held in the driveshaft **228** and which moves a drive member **246** on the orbital path **48** about the central axis **44**, which drive member for its part is mounted on the eccentric drive journal **244** so as to be rotatable about an eccentric journal axis **245** by a rotatable mounting of the eccentric drive journal **244** in a drive journal receptacle **247** in the drive member **246** and additionally is mounted in a rotary bearing **248**, in particular a rolling element bearing formed as a fixed bearing, so as to be rotatable about the central axis **46** of the compressor body **26** movable in an orbiting manner, wherein the rotary bearing **248** allows a rotation of the drive member **246** about the central axis **46** relative to the compressor body **26** movable in an orbiting manner, as shown in FIGS. **7** and **8**.

In order to receive the rotary bearing **248**, the second compressor body **26** is provided with an integrated drive member receptacle **249**, as shown in FIG. **11**, which receives the rotary bearing **248**.

The drive member receptacle **249** is set back here relative to the flat side **98** of the compressor body base **36** and is thus arranged in an integrated manner in the compressor body base **36**, such that the drive forces acting on the movable compressor body **26** are effective on a side of the flat side **98** of the compressor body base **36** facing the scroll rib **38** and thus drive the movable compressor body **26** with a small tilting moment, which compressor body, by means of the axial guide **96** as considered in the direction of the central axis **44**, is axially supported between the drive member receptacle **249** and the drive motor **222** and is guided movably transversely to the central axis **44**.

In the solution according to the invention the drive member receptacle **249**, as shown in FIGS. **2** and **11**, is surrounded by the axial support face **102** arranged outwardly relative to the central axis **46** in the radial direction, and the axial support face **102** is for its part surrounded by the coupling element sets **162**, arranged outwardly relative to the central axis **44** in the radial direction, of the coupling **164** preventing the second compressor body **26** from rotating by itself.

As a result of the rotatability of the drive member **246** about the eccentric journal axis **245** and about the central axis **46**, the compressor orbital radius VOR in particular, defined by the spacing of the central axis **46** of the movable compressor body **24** from the central axis **44** of the stationary compressor body **24** and the driveshaft **228**, is variably adjustable, such that the movable compressor body **26** and therefore also the central axis **46** can each be moved radially outwardly away from the central axis **44** to such an extent that the scroll ribs **34**, **38** bear against one another and close off the compressor chambers **42** tightly.

To this end, in particular the spacing of the eccentric journal axis **245** from the central axis **44** of the stationary compressor body **24** is selected to be greater than the provided compressor orbital radius VOR, that is to say the spacing of the central axes **44** and **46** from one another, and so great that the eccentric journal axis **245** is arranged at a spacing from the driveshaft **228** outside a central axis plane ME running through the two central axes **44** and **46** and counter to a rotational direction D of the driveshaft (FIG. **9**).

On account of this arrangement of the central axes **44** and **46** and of the eccentric journal axis **245**, the resultant eccentric effect of the eccentric drive journal **244** on the drive member **246** brings about a force FA, which, based on the central axis **46** of the drive member **246**, leads to a force FC acting on the central axis **46** and moving the drive member **246** together with the movable compressor body **26** radially outwardly relative to the central axis **44**, which force FC acts in the central axis plane ME running through the central axis **44** and the central axis **46** and is the result of a force FO acting tangentially relative to the orbital path **48** and moving the drive member **246** together with the movable compressor body **26** on the orbital path **48** about the central axis **44** (FIG. **9**).

The central axis plane ME defined by the central axes **44** and **46** constitutes a plane of symmetry with respect to a system formed from the mass of the driveshaft **228** and the mass of the movable compressor body **26** together with the mass of the drive member **246** and is also referred to as the mass balancing plane ME.

An orbital path balancing mass **252** is additionally also provided for mass balancing and counteracts the unbalance by the compressor body **26** moving on the orbital path **48** and compensates this to the greatest possible extent, wherein the orbital path balancing mass **252** is also formed and arranged symmetrically with respect to the mass balancing plane ME, as shown in FIG. **10**.

Here, the orbital path balancing mass **252** lies in particular on a side, facing away from the eccentric drive journal **244**, of a transverse plane QE running perpendicularly to the mass balancing plane ME and through the central axis **44**.

In contrast to solutions known from the prior art, the orbital path balancing mass **252** is not held on the drive member **246**, but instead is mounted by means of a guide body **254** on the driveshaft **228**, in particular on the eccentric drive journal **244**.

To this end, the guide body **254** comprises journal receptacle **256**, which passes through the eccentric drive journal **244**, in order to receive the bearing body **245** rotatably about the eccentric journal axis **245**.

Furthermore, at an alignment face **262** of the driveshaft **228** facing the guide body **254** and arranged for example on the end face of the driveshaft **228**, said guide body is guided slidingly by means of a guide face **264** of the guide body **254** facing the alignment face **262**, parallel to an alignment plane **266** running perpendicularly to the central axis **44** of the driveshaft **228**, such that the parallel alignment of the guide body **245** relative to the alignment plane **266** is maintained in the event of all rotational movements about the eccentric journal axis **245**, and therefore the orbital path balancing mass **252** moves on a path **268** about the driveshaft **228** which runs in a path plane **269** parallel to the alignment plane **266**.

The advantage of this solution can be considered to be that the orbital path balancing mass **252** shall be fully uncoupled from the drive member **246** and therefore no longer able to transmit tilting moments with respect to the central axes **44**, **46** to the drive member **246**.

Rather, the transmission of tilting moments from the guide body **254** to the eccentric drive journal **244** is also already largely avoided by the guidance of the guide body **254** relative to the driveshaft **228**.

In order to hold the guide face **264** in abutment against the end face **262**, an axial guide **272** for the guide body **254** relative to the driveshaft **228** is provided, which, in a first exemplary embodiment, is formed as a screw **274** which penetrates a recess or an aperture **276** in the guide body **254** by means of a shaft portion **278**, engages by means of a thread portion **282** in a threaded bore **284** in the driveshaft **228** coaxial with the central axis **44**, and by means of a screw head **286** extends beyond the aperture **276** on a side **287** of the guide body **254** facing the drive member **246**, so as to hold the guide body **254** by means of the guide face **264** in abutment against the alignment face **262**.

Here, however, the aperture **276** is dimensioned such that a limited movement of the guide body **254** relative to the screw **274** and thus also a limited relative rotation of the unit formed of the orbital path balancing mass **252** and guide body **254** about the eccentric journal axis **244** is possible, as shown in FIG. **13**.

The recess or the aperture **276** and the shaft portion **278** of the screw **274** thus form a first movement limiting unit **288** for the movement of the guide body **254** relative to the driveshaft **228**.

The movement limiting unit **288** preferably allows a rotation of the guide body **254** relative to the eccentric drive journal axis **245** which lies in the range of at least ±1° (angle degrees) to at most ±3° (angle degrees), or even better at most ±2° (angle degrees) in order to enable a tolerance compensation, if the orbital path balancing mass **252** tends to adjust itself such that the most optimal orbital mass balancing possible occurs.

In order to ensure a co-rotation between the orbital path balancing mass **252** and the drive member **246** rotatable relative to the eccentric drive journal **244**, a coupling journal **292** is provided as coupling body and is arranged fixedly on the guide body **254**.

In order to provide the connection of the coupling journal **292** to the drive member **246**, the drive member **246** is provided with a recess **296** which receives the coupling journal **292** with play, such that a rotary movement of the drive member **246** about the eccentric journal axis **245** in order to avoid a tolerance-sensitive and optionally also redundant connection of the drive member **246** can be achieved rotatably by the precise mounting of the drive member **246** relative to the eccentric drive journal **244** and by the additional connection of the drive member **246** to the coupling journal **292**, which for its part is likewise mounted rotatably about the eccentric drive journal **244**.

The coupling journal **292** and the recess **296** are preferably arranged such that the coupling journal **292** in normal operation abuts against a portion of an inner wall face **298** of the recess **296**, said portion being arranged at the front in the direction of rotation.

The mass not taken into consideration in the above-described mass balancing is the mass of the eccentric drive journal **244**, which is arranged asymmetrically with respect to the mass balancing plane ME and causes the driveshaft **228** to vibrate, in particular at high rotational speeds.

For this reason, in addition to the eccentric drive journal **244** engaging in the driveshaft **228**, the coupling journal **292** arranged fixedly on the guide body **254** is also arranged as a mass balancing body (FIG. **8**), which is arranged on the guide body **254** on a side of the mass balancing plane ME opposite the eccentric drive journal **244** (FIG. **10**) and therefore together with the eccentric drive journal **244** leads in turn to an at least approximately symmetrical mass distribution with respect to the mass balancing plane ME.

A journal axis **294** of the coupling journal **292** and the eccentric journal axis **245** are preferably arranged mirror-symmetrically with respect to the mass balancing plane ME, and in addition the eccentric drive journal **244** and the coupling journal **292** preferably have approximately the same mass (FIG. **10**).

The coupling journal **292** is fixed to the guide body **254** for example in that the coupling journal **292** passes through a receiving bore **312** in the guide body **254** and is fixed therein by a press fit.

To axially fix the position of the coupling journal **292** on the guide body **254**, the coupling journal **292** is also provided with a head **314**, which bears against a side of the guide body **254** facing away from the drive member **246** (FIG. **16**).

For further mass balancing the driveshaft **228** is also provided with an unbalance compensation mass **322** facing the compressor and with an unbalance compensation mass **324** facing away from the compressor (FIGS. **2** and **17**).

The unbalance compensation mass **322** facing the compressor is preferably arranged between the drive motor **222** and the bearing unit **232** facing the compressor on a portion **326** of the driveshaft **228** facing the compressor and radially within winding heads **332** of a stator winding, and this lies on the same side of the transverse plane QE as the orbital path balancing mass **252** and is arranged symmetrically with respect to the mass balancing plane ME.

The unbalance compensation mass **324** facing away from the compressor lies preferably on a portion **328** of the driveshaft **228** facing away from the compressor and between the drive motor **222** and the bearing unit **234** facing away from the compressor, and radially within winding heads **334** of the stator winding.

In a second exemplary embodiment of the solution according to the invention, shown in FIG. **18**, the axial guide **272'** for the guide body **254** is formed by a journal **342** molded on the driveshaft **228**, which journal passes through the aperture **276** in the guide body **254** by means of a shaft portion **344** and bears a retaining ring **346**, which is arranged on the side **287** facing the drive member **246** in a manner extending beyond the aperture **276** radially and thus positions the guide body **254** in the same way as the screw head **286**, such that the guide face **264** is held in abutment against the alignment face **262**.

The shaft portion **344** thus also cooperates with the aperture **276** and forms the first movement limiting unit **288'**.

All other features of the second exemplary embodiment are identical to those of the first exemplary embodiment, and therefore reference is made fully in this regard to the descriptions of the first exemplary embodiment.

In a third exemplary embodiment of the solution according to the invention the axial guide **272"** for the guide body **254** is formed by a projection **352**, in particular a collar, which is molded on the eccentric drive journal **244"** and, as shown in FIG. **19**, secures the guide body **254** against a movement in the direction of the central axis **44** away from the alignment face **262** and to this end for example engages in an indentation **354**, which extends from a side **287** facing the drive member **246** into the guide body **254** (FIG. **19**).

In the second exemplary embodiment the first movement limiting unit **288"** is also formed by the head **314** of the mass balancing journal **292**, which engages with play in an end-face recess or indentation **362** in the driveshaft **228**. The limited rotatability of the guide body **254** relative to the driveshaft **228** is thus defined by the relative dimensions of the head **314** and of the indentation **362**.

For the rest, all other elements of the third exemplary embodiment are identical to those of the first exemplary embodiment, and therefore reference can be made fully in this regard to the descriptions of the first exemplary embodiment.

In a fourth exemplary embodiment of the solution according to the invention, shown in FIG. **20**, the eccentric drive journal **244** cooperates with the drive journal receptacle **247'''** merely in a central portion **372** thereof, which is arranged in the direction of the eccentric journal axis **245** in the drive journal receptacle **247'''** such that it is intersected by a central plane **374** of the rotary bearing **248** running perpendicularly to a central axis **46** of the movable second compressor body **26** or perpendicularly to the eccentric journal axis **245** and lying centrally between the end faces **376** and **378** of said rotary bearing.

The central portion **372** here has an extent in the direction of the eccentric journal axis **245** which corresponds at most to half, even better at most a third of the extent of the drive journal receptacle in this direction.

End portions **382** and **384** of the drive journal receptacle **247'''** are arranged on either side of the central portion **372**, the diameter of said end portions being greater than that of the central portion **372** and said end portions extending in the direction of the eccentric journal axis **245** approximately with the same extent, which means that in particular the end portions **382**, **384** differ in their extent by less than a factor of 2, such that in the region thereof a gap **386**, **388** remains between each of the end portions **382** and **384** and the eccentric drive journal **244**.

The eccentric drive journal **244** in this exemplary embodiment thus acts on the drive member **246** merely in the central portion **372** and thus merely in the region of the central plane **374**, such that the rotary bearing **248**, and also the drive member **246**, does not experience any tilting moments as a result of the effect of the eccentric drive journal **244**.

Similarly, the recess **296'''** is also configured to receive the coupling journal **292** such that the coupling journal **292** acts on the recess **296'''** in a central portion **392** of said recess, wherein the central portion **392** has an extent in the direction of the journal axis **294** similar or comparable to that of the central portion **372** of the drive journal receptacle **247"**.

End portions **394** and **396** of the recess **296'''** are also likewise provided on either side of the central portion **392**, the diameter of said end portions being greater than that of the central portion **392**, such that likewise gaps **402** and **404** form between the end portions **394** and **396**.

The end portions **394** and **396** extend in the direction of the journal axis **294** approximately with the same extent as the end portions **382** and **384**, such that the same relationships relative to the central portion **392** are provided as between the central portion **372** and the end portions **382** and **384**.

The coupling journal **292** in this exemplary embodiment thus acts on the drive member **246** likewise merely in the central portion **392** and thus merely in the region of the central plane **374**, such that likewise no tilting moment acts on the drive member **246** as a result of the coupling journal **292**.

It is thus ensured in this exemplary embodiment that, even if tilting moments occur in the region of the driveshaft **228** and should be transmitted by the eccentric drive journal **244**, and even if tilting moments occur by the guide body **254** with the orbital path balancing mass **252** and should be transmitted by the coupling journal **292**, the rotary bearing **248** can rotate substantially freely of tilting moments of this kind and therefore does not experience any reduction to its service life caused by tilting moments.

The invention claimed is:

1. A compressor, comprising;

a compressor housing, a scroll compressor unit which is arranged in the compressor housing and comprises a first stationary compressor body with first scroll ribs, and a second compressor body with second scroll ribs, the second compressor body movable relative to the first stationary compressor body, the first and second scroll ribs of which are each formed as an involute of a circle, engage with one another and form compressor chambers when the second compressor body is moved, relative to the first stationary compressor body, on an orbital path;

an axial guide which supports the second compressor body in respect of movements in a direction parallel to a central axis of the first stationary compressor body and guides the second compressor body in the event of movements in a direction transverse to the central axis;

an eccentric drive for the scroll compressor unit, said eccentric drive having a drive member which is driven by a drive motor and which revolves about a central axis of a driveshaft on the orbital path and which cooperates with a drive member receptacle of the second compressor body;

an orbital path balancing mass which counteracts an unbalance due to the second compressor body moving on the orbital path, and a coupling preventing the second compressor body from rotating;

wherein the orbital path balancing mass is coupled to the eccentric drive such that said orbital path balancing mass moves on the orbital path in a manner corresponding to the movement of the drive member but is uncoupled with respect to a transmission of tilting moments to the drive member;

wherein the orbital path balancing mass is guided on the driveshaft by means of a guide body cooperating with the driveshaft;

wherein the guide body is guided relative to the driveshaft by an axial guide; and

wherein the axial guide holds a guide face of the guide body in abutment against an alignment face of the driveshaft.

2. A compressor according to claim **1**, wherein the orbital path balancing mass is guided by the guide body engaging with the driveshaft on a path which runs in a path plane which runs parallel to an alignment plane running perpendicularly to the central axis of the driveshaft.

3. A compressor according to claim **1**, wherein the guide body is plate-shaped.

4. A compressor according to claim **1**, wherein the axial guide comprises an element acting on the guide body on a side opposite a guide face.

5. A compressor according to claim **4**, wherein the element is a retaining ring fixed relative to the driveshaft.

6. A compressor according to claim **4**, wherein the element is a projection arranged on the eccentric drive journal.

7. A compressor according to claim **1**, wherein the guide body is rotatable relative to an eccentric drive journal to a limited extent.

8. A compressor, comprising;

a compressor housing, a scroll compressor unit which is arranged in the compressor housing and comprises a first stationary compressor body with first scroll ribs, and a second compressor body with second scroll ribs, the second compressor body movable relative to the first stationary compressor body, the first and second scroll ribs of which are each formed as an involute of a circle, engage with one another and form compressor chambers when the second compressor body is moved, relative to the first stationary compressor body, on an orbital path;

an axial guide which supports the second compressor body in respect of movements in a direction parallel to a central axis of the first stationary compressor body and guides the second compressor body in the event of movements in a direction transverse to the central axis;

an eccentric drive for the scroll compressor unit, said eccentric drive having a drive member which is driven by a drive motor and which revolves about a central axis of a driveshaft on the orbital path and which cooperates with a drive member receptacle of the second compressor body;

an orbital path balancing mass which counteracts an unbalance due to the second compressor body moving on the orbital path, and a coupling preventing the second compressor body from rotating;

wherein the orbital path balancing mass is coupled to the eccentric drive such that said orbital path balancing mass moves on the orbital path in a manner corresponding to the movement of the drive member but is uncoupled with respect to a transmission of tilting moments to the drive member;

wherein the orbital path balancing mass is guided on the driveshaft by means of a guide body cooperating with the driveshaft;

wherein the guide body is guided relative to the driveshaft by an axial guide;

wherein the axial guide comprises an element acting on the guide body on a side opposite the guide face; and

wherein the element is a screw head of a screw engaging in the driveshaft.

9. A compressor, comprising;

a compressor housing, a scroll compressor unit which is arranged in the compressor housing and comprises a first stationary compressor body with first scroll ribs, and a second compressor body with second scroll ribs, the second compressor body movable relative to the first stationary compressor body, the first and second scroll ribs of which are each formed as an involute of a circle, engage with one another and form compressor chambers when the second compressor body is moved, relative to the first stationary compressor body, on an orbital path;

an axial guide which supports the second compressor body in respect of movements in a direction parallel to a central axis of the first stationary compressor body and guides the second compressor body in the event of movements in a direction transverse to the central axis;

an eccentric drive for the scroll compressor unit, said eccentric drive having a drive member which is driven by a drive motor and which revolves about a central axis of a driveshaft on the orbital path and which cooperates with a drive member receptacle of the second compressor body;

an orbital path balancing mass which counteracts an unbalance due to the second compressor body moving on the orbital path, and a coupling preventing the second compressor body from rotating;

wherein the orbital path balancing mass is coupled to the eccentric drive such that said orbital path balancing mass moves on the orbital path in a manner corresponding to the movement of the drive member but is uncoupled with respect to a transmission of tilting moments to the drive member;

wherein the orbital path balancing mass is guided on the driveshaft by means of a guide body cooperating with the driveshaft;

wherein the guide body is rotatable relative to an eccentric drive journal to a limited extent; and

wherein a first movement limiting unit is effective between the driveshaft and the guide body.

10. A compressor according to claim **9**, wherein the guide body is guided by means of a guide face at an alignment face of the driveshaft.

11. A compressor according to claim **10**, wherein the alignment face provided on the driveshaft is an end face of the driveshaft.

12. A compressor according to claim **10**, wherein the guide body is arranged in a manner extending beyond the alignment face.

13. A compressor according to claim **10**, wherein the guide body is arranged between the alignment face of the driveshaft and the drive member.

14. A compressor according to claim **9**, wherein the first movement limiting unit allows a free rotatability of the guide body relative to the driveshaft in the range of from 0.5° (angle degrees) to 5° (angle degrees).

15. A compressor according to claim **9**, wherein the first movement limiting unit is formed by a stop body held on the guide body or the driveshaft and a recess receiving the stop body and arranged on the driveshaft or the guide body respectively.

16. A compressor, comprising;

a compressor housing, a scroll compressor unit which is arranged in the compressor housing and comprises a first stationary compressor body with first scroll ribs, and a second compressor body with second scroll ribs, the second compressor body movable relative to the first stationary compressor body, the first and second scroll ribs of which are each formed as an involute of a circle, engage with one another and form compressor chambers when the second compressor body is moved, relative to the first stationary compressor body, on an orbital path;

an axial guide which supports the second compressor body in respect of movements in a direction parallel to a central axis of the first stationary compressor body and guides the second compressor body in the event of movements in a direction transverse to the central axis;

an eccentric drive for the scroll compressor unit, said eccentric drive having a drive member which is driven by a drive motor and which revolves about a central axis of a driveshaft on the orbital path and which cooperates with a drive member receptacle of the second compressor body;

an orbital path balancing mass which counteracts an unbalance due to the second compressor body moving on the orbital path, and a coupling preventing the second compressor body from rotating;

wherein the orbital path balancing mass is coupled to the eccentric drive such that said orbital path balancing mass moves on the orbital path in a manner corresponding to the movement of the drive member but is uncoupled with respect to a transmission of tilting moments to the drive member;

wherein the orbital path balancing mass is guided on the driveshaft by means of a guide body cooperating with the driveshaft; and

wherein a first movement limiting unit is effective between the driveshaft and the guide body and allows a limited free rotatability of the guide body about an eccentric journal axis.

17. A compressor according to claim **16**, wherein the guide body is fixedly connected to the orbital path balancing mass.

18. A compressor according to claim **16**, wherein the eccentric drive journal passes through a journal receptacle in the guide body.

19. A compressor according to claim **16**, wherein the orbital path balancing mass is arranged symmetrically with respect to a mass balancing plane which runs through the central axis of the driveshaft and through the central axis of the second compressor body.

20. A compressor according to claim **19**, wherein the orbital path balancing mass is arranged on a side, opposite an eccentric drive journal, of a geometric transverse plane running perpendicularly to the mass balancing plane and through the central axis of the driveshaft.

21. A compressor, comprising:

a compressor housing;

a scroll compressor unit which is arranged in the compressor housing and comprises a first stationary compressor body with first scroll ribs, and a second compressor body with second scroll ribs, the second compressor body movable relative to the first stationary compressor body, the first and second scroll ribs of which are each formed as an involute of a circle, engage with one another and form compressor chambers when the second compressor body is moved, relative to the first stationary compressor body, on an orbital path;

an axial guide which supports the second compressor body in respect of movements in a direction parallel to a central axis of the first stationary compressor body and guides the second compressor body in the event of movements in a direction transverse to the central axis;

an eccentric drive for the scroll compressor unit, said eccentric drive having a drive member which is driven by a drive motor and which revolves about a central axis of a driveshaft on the orbital path and which cooperates with a drive member receptacle of the second compressor body;

an orbital path balancing mass which counteracts an unbalance due to the second compressor body moving on the orbital path; and

a coupling preventing the second compressor body from rotating;

wherein the eccentric drive comprises an eccentric drive journal driving the drive member and comprises a coupling body that couples the orbital path balancing mass to the drive member;

wherein the coupling body is also a mass balancing body; and

wherein the coupling body has a mass which differs at most by 20% from the mass of the eccentric drive journal.

22. A compressor according to claim **21**, wherein the orbital path balancing mass is guided on the orbital path by an eccentric drive journal acting between the drive member and the driveshaft.

23. A compressor according to claim **21**, wherein the coupling body is effective between a guide body and the drive member.

24. A compressor according to claim **21**, wherein the coupling body is arranged fixedly on either of a guide body or drive member and engages in a recess in the other of the guide body or drive member.

25. A compressor according to claim **24**, wherein the coupling body is arranged in the recess with play.

26. A compressor according to claim **21**, wherein the coupling body is configured as a coupling journal.

27. A compressor according to claim **21**, wherein the eccentric drive journal and the coupling body are arranged on mutually opposed sides of a mass balancing plane.

28. A compressor according to claim **27**, wherein the mass balancing plane runs through the central axis of the driveshaft and the central axis of the second compressor body movable in an orbiting manner.

29. A compressor according to claim **21**, wherein the coupling body is configured as a mass balancing journal.

30. A compressor according to claim **21**, wherein the driveshaft has a portion facing away from the scroll com-

pressing unit, which portion carries an unbalance compensation mass facing away from the scroll compressing unit.

31. A compressor according to claim **30**, wherein the unbalance compensation mass facing away from the compressor is arranged between a rotor of the drive motor and a rear bearing unit of the driveshaft.

32. A compressor, comprising:

a compressor housing;

a scroll compressor unit which is arranged in the compressor housing and comprises a first stationary compressor body with first scroll ribs, and a second compressor body with second scroll ribs, the second compressor body movable relative to the first stationary compressor body, the first and second scroll ribs of which are each formed as an involute of a circle, engage with one another and form compressor chambers when the second compressor body is moved, relative to the first stationary compressor body, on an orbital path;

an axial guide which supports the second compressor body in respect of movements in a direction parallel to a central axis of the first stationary compressor body and guides the second compressor body in the event of movements in a direction transverse to the central axis;

an eccentric drive for the scroll compressor unit, said eccentric drive having a drive member which is driven by a drive motor and which revolves about a central axis of a driveshaft on the orbital path and which cooperates with a drive member receptacle of the second compressor body;

an orbital path balancing mass which counteracts an unbalance due to the second compressor body moving on the orbital path; and

a coupling preventing the second compressor body from rotating;

wherein the eccentric drive comprises an eccentric drive journal driving the drive member and comprises a coupling body that couples the orbital path balancing mass to the drive member;

wherein the coupling body is also a mass balancing body; and

wherein the coupling body has substantially the same mass as the eccentric drive journal.

33. A compressor, comprising:

a compressor housing;

a scroll compressor unit which is arranged in the compressor housing and comprises a first stationary compressor body with first scroll ribs, and a second compressor body with second scroll ribs, the second compressor body movable relative to the first stationary compressor body, the first and second scroll ribs of which are each formed as an involute of a circle, engage with one another and form compressor chambers when the second compressor body is moved, relative to the first stationary compressor body, on an orbital path;

an axial guide which supports the second compressor body in respect of movements in a direction parallel to a central axis of the first stationary compressor body and guides the second compressor body in the event of movements in a direction transverse to the central axis;

an eccentric drive for the scroll compressor unit, said eccentric drive having a drive member which is driven by a drive motor and which revolves about a central axis of a driveshaft on the orbital path and which cooperates with a drive member receptacle of the second compressor body;

an orbital path balancing mass which counteracts an unbalance due to the second compressor body moving on the orbital path; and

a coupling preventing the second compressor body from rotating;

wherein the eccentric drive comprises an eccentric drive journal driving the drive member and comprises a coupling body that couples the orbital path balancing mass to the drive member;

wherein the coupling body is also a mass balancing body;

wherein the coupling body is configured as a mass balancing journal; and

wherein a journal axis of the mass balancing journal is arranged at the same spacing from a mass balancing plane as an eccentric journal axis of the eccentric drive journal.

34. A compressor according to claim **33**, wherein the journal axis of the mass balancing journal runs substantially parallel to the eccentric drive axis of the eccentric drive journal.

35. A compressor according to claim **33**, wherein a journal axis of the mass balancing journal and the eccentric journal axis of the eccentric drive journal run parallel to the mass balancing plane.

36. A compressor according to claim **33**, wherein the orbital path balancing mass is arranged on a side, opposite the eccentric drive journal and the mass balancing body, of a geometric transverse plane running perpendicularly to the mass balancing plane and through the central axis of the driveshaft.

37. A compressor according to claim **33**, wherein the driveshaft has a portion facing the compressor, which portion carries an unbalance compensation mass facing the compressor and carries the eccentric drive journal and in particular guides the mass balancing body and the orbital path balancing mass.

38. A compressor according to claim **37**, wherein the unbalance compensation mass facing the compressor is arranged on the driveshaft between a rotor of the drive motor and a front bearing unit.

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